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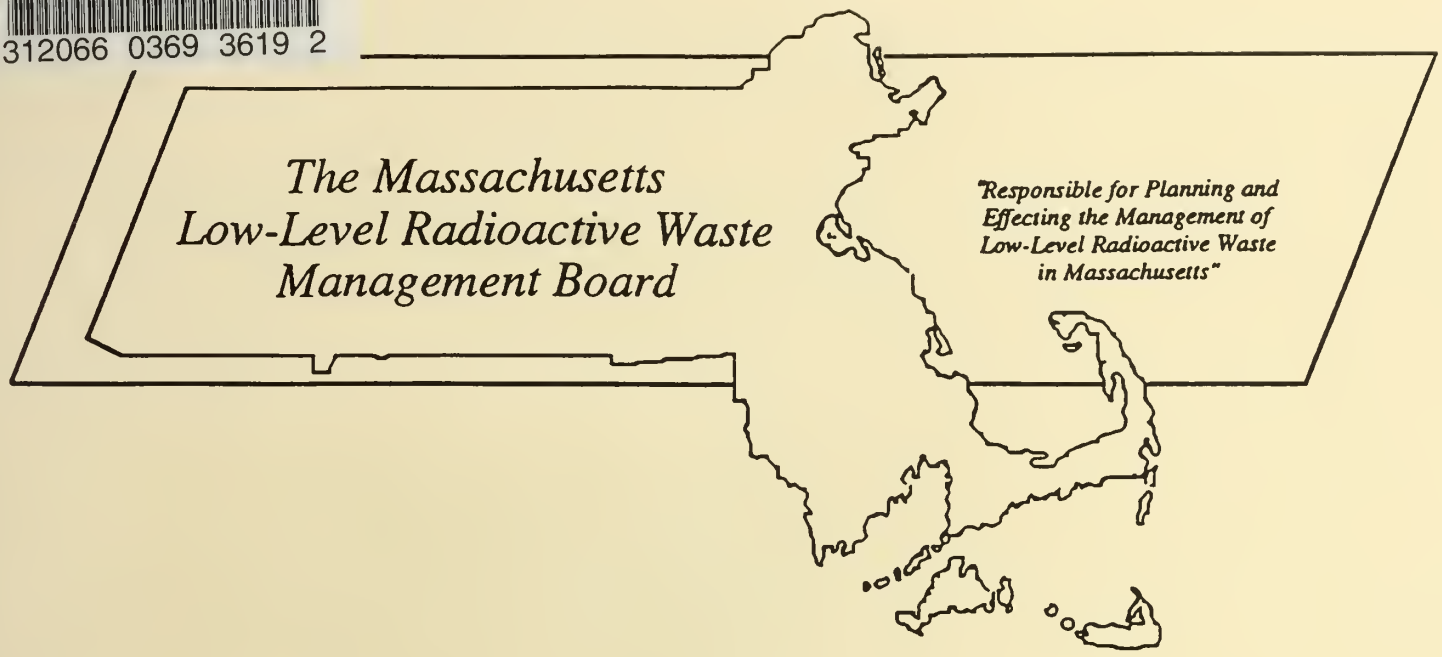

1996 Massachusetts Low-Level Radioactive Waste Survey Report

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1996 Massachusetts Low-Level Radioactive Waste Survey Report

March 1998

THE COMMONWEALTH OF MASSACHUSETTS
Low-Level Radioactive Waste Management Board

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Preface

The Low-Level Radioactive Waste Management Board was established in 1987 under the provisions of section 2 of Chapter 111H of the Massachusetts General Laws, and is the lead state agency responsible for planning and effecting the management of low-level radioactive waste (LLRW) in the Commonwealth.

The Management Board conducts an annual survey to determine the characteristics of LLRW generated, stored, treated, or shipped for out-of-state disposal. The Massachusetts Low-Level Radioactive Waste Management Act (Chapter 111H), mandates under section 7 that each person who generates, treats, stores, transports, or disposes of LLRW within the Commonwealth shall annually provide detailed and accurate information concerning the types, volumes, radioactivity, sources, and characteristics of the LLRW produced as well as current and projected LLRW management activities, including source minimization, volume minimization, on-site storage, treatment, packaging, and transportation practices.

This report summarizes data compiled from responses to the "1996 Low-Level Radioactive Waste Classification Survey" of radioactive materials users licensed in Massachusetts by the U.S. Nuclear Regulatory Commission (NRC) or registered by the Massachusetts Department of Public Health (DPH). The data provided by the generators in the annual survey is used in connection with the Management Board's activities to arrange storage, treatment, and disposal solutions for LLRW generated in Massachusetts and to formulate LLRW policy in the Commonwealth.

Comments on this document and suggestions for future survey reports are welcome and should be addressed to:

Massachusetts Low-Level Radioactive Waste Management Board
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The focus of this report is on the characteristics and management of low-level radioactive waste (LLRW) in the Commonwealth. The data collected enables the Management Board to formulate policy on LLRW storage, treatment, disposal, and other management activities. It also enables the Board to evaluate the data using its "total hazard" classification system; a process that not only categorizes LLRW on the basis of its radiological characteristics (such as radioactive half-life, principal radionuclides and their concentrations present in the waste, radioisotopic quantities, etc.), but also on its chemical and biological toxicity, chemical reactivity, form, and volume. This classification system is used by the Board to determine which classes of LLRW with relatively short half-lives may be stored for natural radioactive decay, which classes will require disposal, and which classes will require special management procedures during the life of a disposal facility accepting LLRW in the Commonwealth, should such a facility be necessary.

The annual survey also is used in conjunction with the Management Board's activities to arrange storage, treatment, and disposal solutions for LLRW generated in Massachusetts. Both in-state and out-of-state disposal options require the detailed characterization of: (1) the total waste inventory placed in a facility throughout its operating life; and (2) the amounts of activity remaining in the facility during the closure and post-closure observation and maintenance phases, and at the end of its institutional control period.[1] In the

[1]The "closure," "post-closure observation and maintenance," and "institutional control" phases of a facility involve the time, after waste is no longer accepted at the facility (closure), when the facility operator actively monitors and maintains the facility in preparation for the transfer of the facility license from the operator to the Commonwealth (post-closure observation and maintenance), and when the Commonwealth assumes responsibility for continued facility observation, monitoring, and care (institutional control). In the case of a disposal facility, these phases likely will total several hundred years.

case of any in-state disposal facility, Massachusetts law requires that, at the end of the institutional control period, any LLRW that has not decayed to the "maximum concentrations above natural background levels permitted to be released into air or water in unrestricted areas under federal and state law" must be removed from the facility.[2] The annual survey is the primary data source for facility inventory projections.

1996 Survey Report Contents

The annual survey requests LLRW management information for the survey year and projections for the next three years. Chapter 1 is an Executive Summary, presenting volume and activity data on LLRW shipped for disposal in 1996, and showing the distribution of large and small generators. Chapter 2 presents the data by each management method, including shipment for disposal, incineration for disposal, mixed waste storage, specific waste disposal, storage, and storage for decay. Chapter 3 discusses LLRW disposal trends and generator projections for policy-making purposes. Chapter 4 contains national data with a state-by-state comparison of volume and activity shipped for disposal to the facilitie in Barnwell, South Carolina and Hanford, Washington.

The appendices of this report include a discussion of the sources and types of LLRW; a description of the LLRW management methods employed by licensees; definitions; and additional characteristic data in a number of tables. These tables provide Massachusetts LLRW producer information, LLRW characteristic data by waste category, mixed waste characteristic data, and radioactivity information. Also included in the appendices is a discussion of the impact of radioactive decay.

Tables and figures in this report present survey responses rounded by standard methods, and therefore totals may not equal 100%.

[2] This requirement is contained in Section 46 of Chapter 111H of the Massachusetts General Laws.

Chapter 1
Executive Summary

1.1 Volume and Activity Data of LLRW Shipped for Disposal in 1996

During 1996, Massachusetts generators had access to the three disposal facilities in the country that accept low-level radioactive waste (LLRW). Envirocare of Utah received LLRW primarily from decommissioning and remediation projects in the form of soil and building rubble containing very low concentrations of radioactive materials, as well as smaller amounts of contaminated dry active waste and dewatered sludges. The Hanford, Washington facility accepted only waste from naturally-occurring or accelerator-produced radioactive material (NARM) from Massachusetts. The Barnwell, South Carolina facility accepted Class A, B, and C LLRW, but no waste mixed with, or exhibiting characteristics of, toxic chemical hazardous material. (See Appendix A for LLRW classifications and definitions.)

During 1996, **67** Massachusetts generators reported that they shipped **246,701 cubic feet** of LLRW containing **16,481 curies** of activity to out-of-state disposal facilities. The vast majority of disposal volume, **244,930 cubic feet**, was Class A (99.3%) followed by **1,143 cubic feet** of Class C (0.5%), and **628 cubic feet** of Class B (0.3%). By activity, Class B contributed the largest quantity (88.5%) with **14,582 curies**, followed by Class C (10.9%) with **1,798 curies**, and Class A (0.6%) with **101 curies**.

LLRW generated in 1996 resulted from either normal or "routine" operations at companies and institutions that use radioactive materials or from "non-routine" activities, such as the one-time decommissioning and remediation of old burial sites in the Commonwealth. Routine and non-routine LLRW combined represent the total quantity of LLRW shipped to out-of-state disposal facilities. LLRW from non-routine site decommissioning and remediation projects had a significant impact on the quantity of waste shipped for disposal by Massachusetts generators during 1996, but little impact on the activity in the disposed waste.

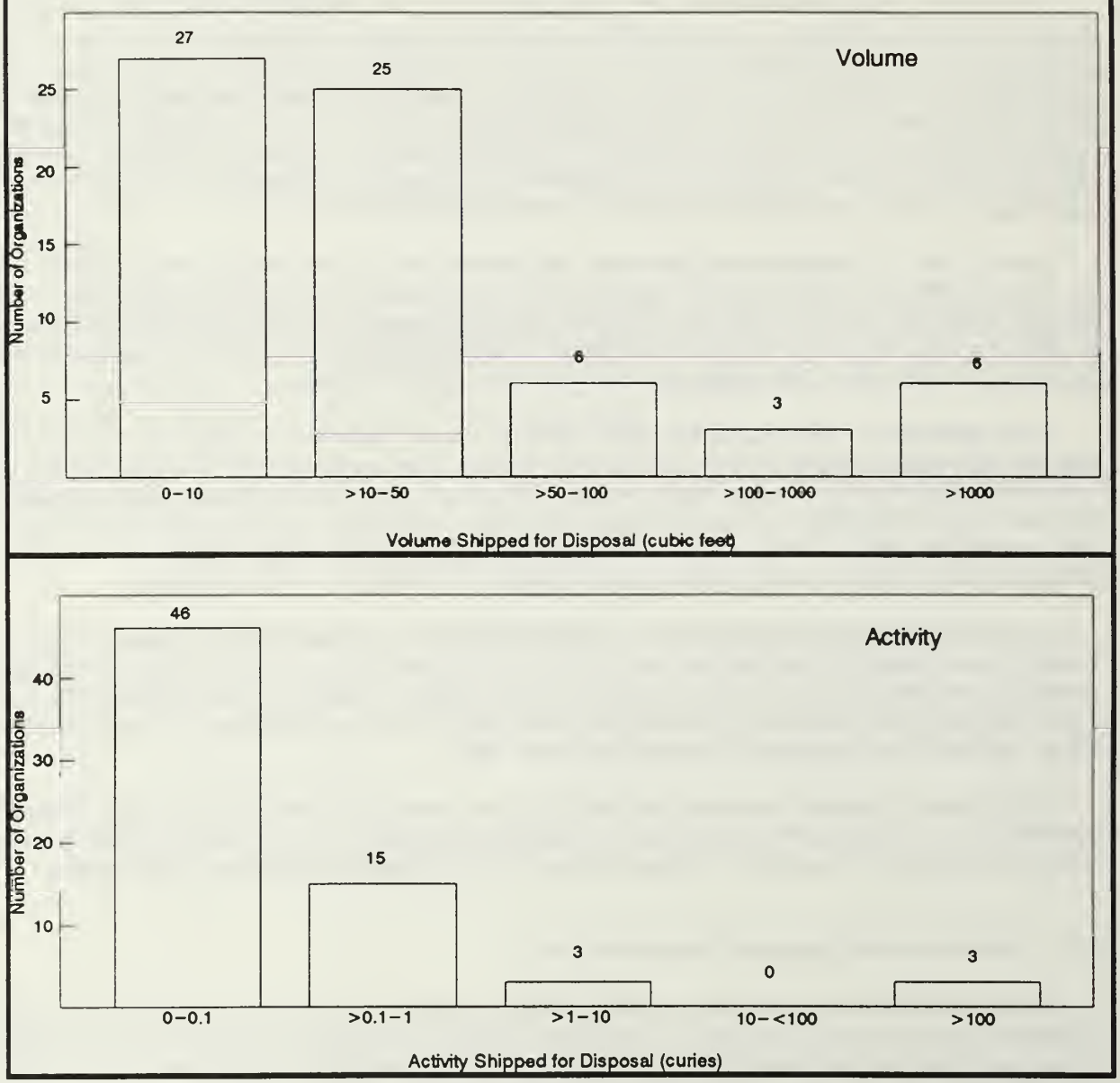
Nearly 92% (**226,553 cubic feet**) of the total volume shipped for disposal in 1996 consisted of soils and building rubble, classified as high-volume, low-activity (HVLA) waste, from non-routine activities. HVLA waste comprised very little (less than 0.1%) of the total activity shipped for disposal in 1996. Almost 99% of the HVLA (**226,259 cubic feet**) shipped for disposal was produced by Texas Instruments of North Attleboro, which completed its remediation activities in September, 1996.

Routine waste dominated the activity shipped for disposal. Nearly 85% of the activity shipped for disposal came from Du Pont Medical Products which manufactures radioactive tracers for use in medical research. Routine waste volume managed by disposal totaled **20,148 cubic feet** and contained **16,480 curies**.

1.2 Distribution of Large and Small Generators

The 67 organizations that reported shipping LLRW for disposal represent an increase of 28 over the number that shipped waste for disposal in 1995. Figure 1 shows the distribution of large and small generators by the volume and activity shipped. Of the 67 generators, 58 shipped 100 cubic feet or less (100 cubic feet is equivalent to just over thirteen 55-gallon drums) and 61 shipped 1 curie or less each.

Figure 1
Distribution of Organizations that Shipped LLRW for Disposal During 1996 – by Volume and Activity



Chapter 2
1996 LLRW Management Data Summary

2.1 LLRW Generator Categories

In Massachusetts, more than 365[3] colleges and universities, hospitals, government agencies, biotechnology firms, and other businesses, including two nuclear power plants (one operational and another undergoing decommissioning), were licensed by the U.S. Nuclear Regulatory Commission (NRC) in 1996 to use or possess source, special nuclear, or byproduct material.

Much of the information in this report is grouped by category of generator, of which there are five:

(1) Academic (Acad) - universities, colleges, and other research institutions;

(2) Commercial (Comm) - organizations such as biotechnology, engineering, and construction companies; testing laboratories; radiopharmaceutical manufacturers and suppliers; and companies using radioactive materials for process, quality control, and analysis;

(3) Government (Govt) - local, state, and federal entities, such as water districts, transportation authorities, and health departments;

(4) Health - hospitals, clinics, and physicians; and

(5) Utility - companies that operate or are decommissioning nuclear power plants.

The categories listed above are convenient for data analysis but there is an inherent interrelationship between them. For example, commercial organizations manufacture products, such as radiopharmaceuticals and radionuclides, which are consumed by the medical and academic communities for research. The data shows that organizations in the health and academic categories typically do not ship large quantities of LLRW for disposal. This is because commercial companies manufacture radioisotopes from raw materials and deliver the final product to clinical nuclear medicine programs within the health or academic categories. Any LLRW generated during the production phase is retained by the manufacturer, and hence falls within the commercial category. Although the end use of radioactive materials by hospitals and academic organizations does not generate large quantities of LLRW, the production of health-care radiopharmaceuticals and research radionuclides by commercial entities does.

2.2 Survey Response

The 1996 Radioactive Waste Classification Survey requested data on LLRW produced during the year or retained in storage from previous years. The survey was mailed to 367 companies and institutions licensed by the NRC to possess sources of ionizing radiation involving the use of radioactive materials within the Commonwealth; 313 licensees returned the survey form.[4]

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[3] The total number of radioactive materials licensees in Massachusetts varies from time to time due to the expiration or termination of some licenses, and the issuance of new ones.

[4] Licensees who did not respond typically manage LLRW by storage for decay or transfer of a sealed source to another licensee.

2.3 Licensee LLRW Volume and Activity Management Summary

This section summarizes responses by generator category and each management method defined in Appendix A. Tables 1 - 3 summarize data for all management methods; the next section presents tables and charts summarizing data on LLRW shipped for disposal; and the remaining parts of the section summarize data for each individual management method.

As shown by Table 1, 225 of the 313 organizations who responded (72%) reported producing LLRW during 1996 or storing LLRW produced prior to 1996. The remainder used sealed sources or did not possess radioactive materials during 1996. Of the 225 licensees that produced or stored LLRW, 67 reported that they had shipped waste to one of the three licensed land disposal facilities; the remainder managed their LLRW by methods such as storage for decay, and did not ship LLRW for disposal. Some generators managed their LLRW by a combination of methods, such as disposal and storage for decay.

Table 1
Summary of 1996 Licensee LLRW Management – by Generator Category
(number of organizations)

	Acad	Comm	Govt	Health	Utility	Total	% of Total
Total	31	117	1	74	2	225	100.0
On–Site Management							
Eliminated by Treatment	9	22	0	1	0	32	14.2
Incineration for Disposal	2	0	0	2	0	4	1.8
Mixed Waste Storage	4	13	0	2	1	20	8.9
Specific Disposal	4	8	0	2	0	14	6.2
Storage	22	63	1	10	1	97	43.1
Storage for Decay	29	79	1	69	0	178	79.1
Off–Site Management							
Eliminated by Treatment	10	21	0	7	2	40	17.8
Incineration for Disposal	11	20	0	11	1	43	19.1
Storage	0	2	0	0	0	2	0.9
Storage for Decay	0	8	0	5	0	13	5.8
Shipped for Disposal	12	44	0	9	2	67	29.8

Note: Column percentages total >100% since some organizations used more than one management method.

During 1996, 225 Massachusetts generators reported that they managed 365,952 cubic feet of LLRW, containing 42,792 curies, of which:

- 74,045 cubic feet, containing 25,616 curies, were managed on their premises;
- 45,206 cubic feet, containing 695 curies, were managed off site; and
- 246,701 cubic feet, containing 16,481 curies, were shipped for disposal.

Tables 2 and 3 summarize on-site and off-site LLRW volume and activity management data for 1996 by generator category.

Table 2 Summary of 1996 LLRW Volume Management – by Generator Category (cubic feet)							
	Acad	Comm	Govt	Health	Utility	Total	% of Total
Total Reported[1]	14,890.0	287,010.0	41.4	18,246.0	45,764.7	365,952.1	100.0
On–Site Management							
Eliminated by Treatment	3,174.7	13,134.6	0.0	75.0	0.0	16,384.3	4.5
Incineration for Disposal	1,322.4	0.0	0.0	173.5	0.0	1,495.9	0.4
Mixed Waste Storage	17.3	5,102.0	0.0	19.8	15.0	5,154.1	1.4
Specific Disposal	442.5	108.6	0.0	775.8	0.0	1,326.9	0.4
Storage	327.4	9,640.5	35.8	170.6	4,449.9	14,624.1	4.0
Storage for Decay	7,703.8	13,955.2	5.7	13,395.3	0.0	35,060.0	9.6
On–Site Total	12,988.0	41,940.9	41.4	14,610.1	4,464.9	74,045.3	20.2
Off–Site Management							
Eliminated by Treatment	743.3	5,458.9	0.0	691.7	31,145.1	38,039.0	10.4
Incineration for Disposal	895.7	2,038.1	0.0	479.3	432.0	3,845.0	1.1
Storage	0.0	686.5	0.0	0.0	0.0	686.5	0.2
Storage for Decay	0.0	289.3	0.0	2,346.1	0.0	2,635.4	0.7
Off–Site Total	1,639.0	8,472.8	0.0	3,517.1	31,577.1	45,206.0	12.4
Shipped for Disposal	263.0	236,596.2	0.0	118.9	9,722.7	246,700.9	67.4

[1] Includes LLRW produced in 1996 as well as waste in storage from prior years.

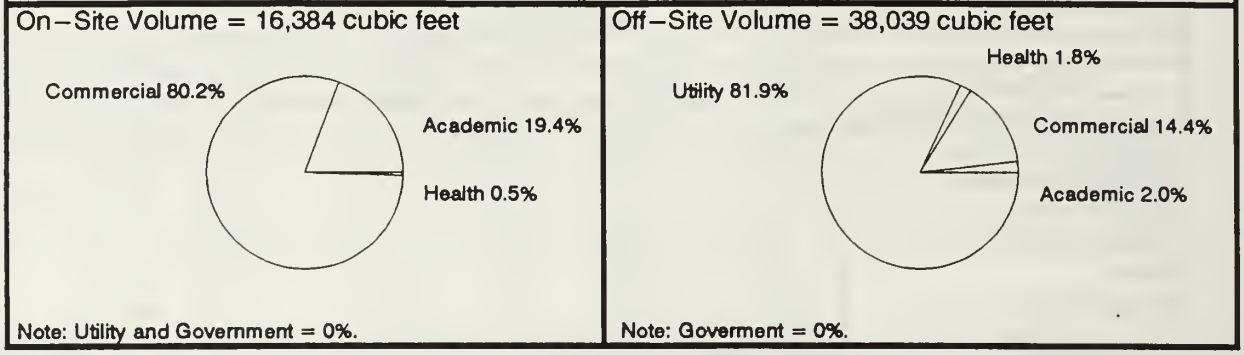
Table 3 Summary of 1996 LLRW Activity Management – by Generator Category (curies)							
	Acad	Comm	Govt	Health	Utility	Total	% of Total
Total Reported[1]	164.732	37,865.437	0.094	1,686.493	3,073.400	42,792.157	100.0
On–Site Management							
Incineration for Disposal	0.090	0.000	0.000	0.056	0.000	0.145	0.0
Mixed Waste Storage	0.001	7,829.278	0.000	0.004	0.000	7,829.283	18.3
Specific Disposal	0.007	0.026	0.000	0.063	0.000	0.095	0.0
Storage	24.086	15,056.144	0.078	9.499	0.000	15,089.806	35.3
Storage for Decay	139.059	954.924	0.017	1,603.071	0.000	2,697.072	6.3
On–Site Total	163.243	23,840.373	0.094	1,612.692	0.000	25,616.402	59.9
Off–Site Management							
Incineration for Disposal	0.156	1.107	0.000	0.089	567.000	568.351	1.3
Storage	0.000	51.260	0.000	0.000	0.000	51.260	0.1
Storage for Decay	0.000	0.124	0.000	74.889	0.000	75.013	0.2
Off–Site Total	0.156	52.491	0.000	74.978	567.000	694.625	1.6
Shipped for Disposal	1.334	13,972.573	0.000	0.823	2,506.400	16,481.130	38.5

[1] includes LLRW produced in 1996 as well as waste in storage from prior years.

2.3.1 Treatment

During 1996, 14% (54,423 cubic feet) of the total LLRW managed by generators in Massachusetts was eliminated by treatment methods both on and off site. Thirty-two organizations reported treating LLRW prior to placing waste in storage, using storage for decay, or shipping the waste for disposal. Figure 2 illustrates the volume of LLRW eliminated by treatment both on and off site, reported by each generator category.

Figure 2
1996 LLRW Volume Eliminated by Treatment– by Generator Category
(percent)



2.3.2 Summary of Volume and Activity Reported by Generator Category and Management Method

Figure 3 shows the proportion of the total volume and activity managed by each generator category. The commercial category managed 78.4% of the total volume, followed by the utility category with 12.5%, the health category with 5.0%, the academic category with 4.1%, and the government category with less than 0.1% of the total.

The commercial category managed 88.5% of the total activity, followed by the utility category with 7.2%, the health category with 3.9%, and the academic and government categories with less than 1.0% of the total activity shipped.

Figure 3
1996 LLRW Volume and Activity Reported – by Generator Category
(percent)

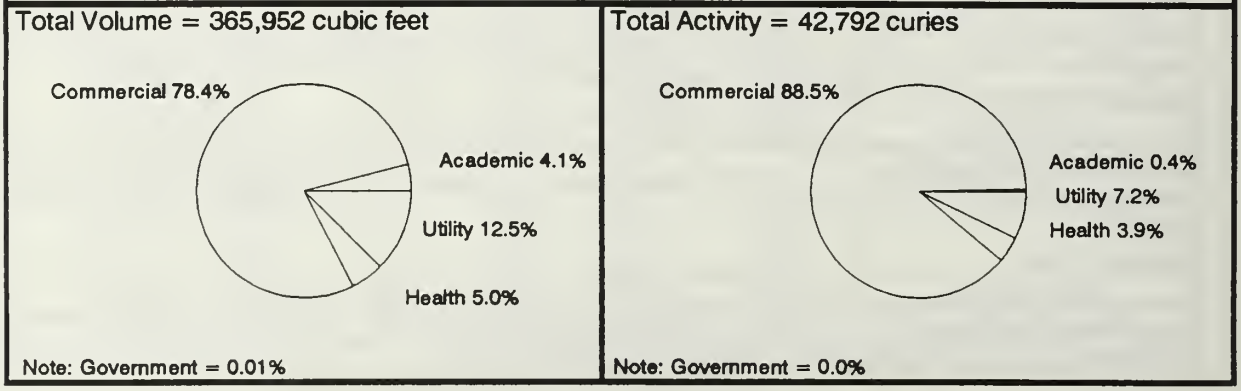


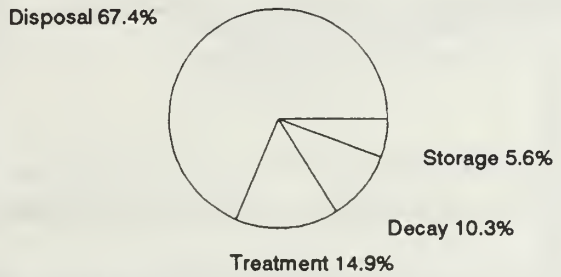
Figure 4 illustrates how generators managed LLRW volume and activity in 1996. LLRW managed by shipping it for disposal accounted for 67.4% of the total reported volume managed. LLRW volume eliminated by on- and off-site treatment techniques (including treatment on LLRW shipped for disposal, placed into storage, or stored for decay) accounted for 14.9% of total volume reported. Management by storage for decay accounted for 10.3% of the total volume, and the remaining management methods totaled 1.8% of the volume managed.

LLRW activity managed by storage contained 53.7% of the total reported activity. Activity managed by

shipping it for disposal contained 38.5% of the total. Activity managed by decay represented 6.5% of the total. The majority of activity stored was contained in sealed sources being stored for partial decay.

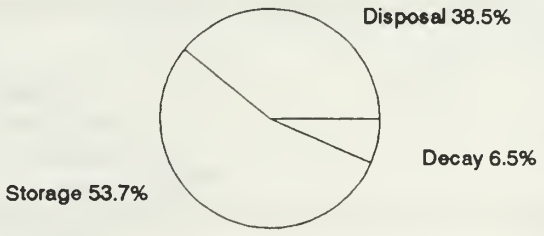
Figure 4
1996 LLRW Volume and Activity Reported – by Management Method
(percent)

Total Volume = 365,952 cubic feet



Note: Remaining 1.8%

Total Activity = 42,792 curies



Note: Remaining <0.1%.

Note: "Decay" = Storage for Decay; "Storage" = storage and mixed waste storage; "Treatment" = eliminated by treatment "Remaining" = total of all other management methods (incineration for disposal & specific disposal).

2.4 LLRW Shipped for Disposal in 1996

During 1996, 246,701 cubic feet of LLRW containing 16,481 curies of activity was disposed of by 67 organizations. Tables 4 and 5 summarize volume and activity data as reported by Massachusetts generators.

Table 4
Summary of 1996 LLRW Volume Shipped for Disposal – by Generator Category
(cubic feet)

	Acad	Comm	Govt	Health	Utility	Total	% of Total
Produced	3,440.5	247,062.0	0.0	855.6	40,867.8	292,225.9	100.0
Eliminated by On-Site Treatment	2,434.2	7,921.8	0.0	45.0	0.0	10,401.0	3.6
Eliminated by Off-Site Treatment	743.3	2,543.9	0.0	691.7	31,145.1	35,124.0	12.0
Total Volume Reduction	3,177.5	10,465.8	0.0	736.7	31,145.1	45,525.0	15.6
Barnwell, South Carolina	263.0	2,863.5	0.0	118.9	9,722.7	12,968.1	4.4
Clive, Utah	0.0	232,224.9	0.0	0.0	0.0	232,224.9	79.5
Hanford, Washington	0.0	1,507.9	0.0	0.0	0.0	1,507.9	0.5
Shipped for Disposal	263.0	236,596.2	0.0	118.9	9,722.7	246,700.9	84.4

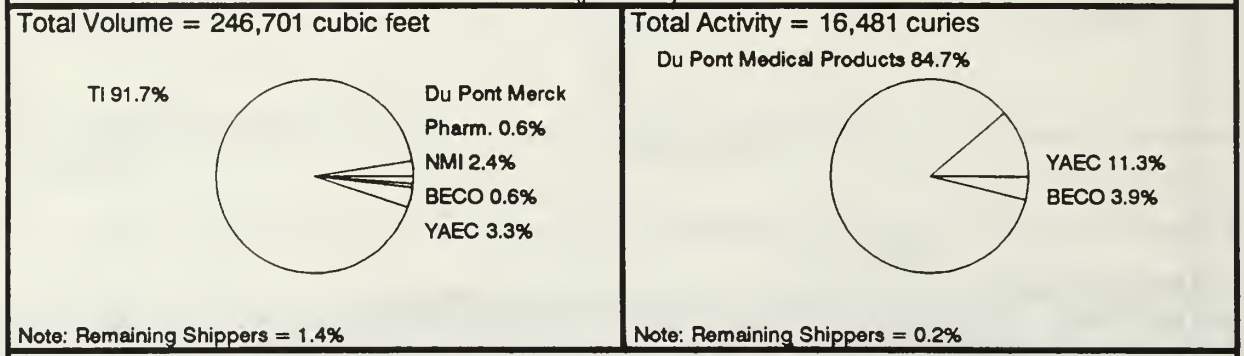
Table 5
Summary of 1996 LLRW Activity Shipped for Disposal – by Generator Category
(curies)

	Acad	Comm	Govt	Health	Utility	Total	% of Total
Produced	1.334	13,972.574	0.000	0.823	2,506.400	16,481.131	100.0
Barnwell, South Carolina	1.334	13,967.703	0.000	0.823	2,506.400	16,476.260	100.0
Clive, Utah	0.000	3.444	0.000	0.000	0.000	3.444	0.0
Hanford, Washington	0.000	1.427	0.000	0.000	0.000	1.427	0.0
Shipped for Disposal	1.334	13,972.574	0.000	0.823	2,506.400	16,481.131	100.0

2.4.1 Major Shippers for Disposal in 1996

Figure 5 shows the major generators[5] of LLRW shipped for disposal in 1996. Information on all survey respondents, including their locations (county and city/town), reasons given for their use of radioactive materials, and waste management data for 1996, can be found in Appendix B.

Figure 5
1996 LLRW Volume and Activity Shipped for Disposal – by Major Shippers
(percent)



Note: BECO = Boston Edison Co., NMI = Nuclear Metals, Inc., TI = Texas Instruments, YAEC = Yankee Atomic Electric Co.

2.4.2 Treatment Prior to Disposal

Many types of LLRW requiring disposal undergo significant volume reduction prior to their delivery to disposal facilities. While treatment is performed both on and off site, the largest volume reduction occurs off-site, primarily at out-of-state treatment facilities. Certain wastes must be processed to meet the disposal facility waste acceptance criteria.[6] Other wastes may not require treatment prior to disposal, but are often processed to reduce disposal costs to the generator.

Figure 6 shows the reported quantities of potential LLRW disposal volume eliminated by on- and off-site treatment by treatment method. The percentage is less than the "eliminated by treatment" percentage reported in Table 2 because only LLRW managed by disposal is counted here.

Survey responses show that compaction and incineration accounted for the largest amount of volume eliminated on and off site respectively. The majority of material in the "other" category for off-site treatment includes animal carcasses treated by steam reforming at a facility in Tennessee. "Steam reforming" is a process where high temperature steam is injected into a waste container to reduce the waste into a powdery substance similar to ash.

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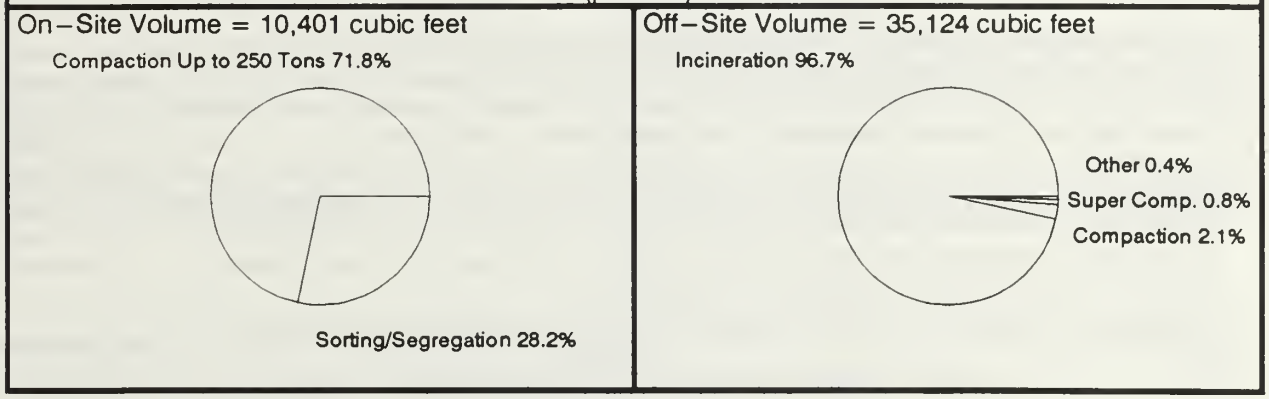
[5] In 1997, Du Pont Medical Products was renamed NEN Life Science Products; Nuclear Metals, Inc. Was renamed Starmet Corporation. For purposes of this report, on 1996 data, the former names will be used.

[6] Generally LLRW must be in solid form and nonvolatile, or placed in a High Integrity Container (HIC) designed to last 300 years if dispersable.

Figure 6
1996 LLRW Disposal Volume Eliminated by Treatment – by Treatment Method
(percent)



2.4.3 Waste Categories Shipped for Disposal

The 1996 survey provides 31 different waste category choices. Typical categories of LLRW include dry active waste (DAW), incinerator ash, biological wastes, and others listed in Table A-1 in Appendix A. Table 6 shows the 15 waste categories identified by LLRW generators that comprised the volume and activity shipped for disposal in 1996.

Table 6
1996 LLRW Volume and Activity Shipped for Disposal – by Waste Category
(cubic feet and curies)

Waste Category	Volume	% of Total	Activity	% of Total
DAW–Soils/Building Rubble	226,552.7	91.8	0.768	0.0
DAW–Compacted Bulk Materials	4,857.5	2.0	14.900	0.1
DAW–Uncompacted Solids	4,106.2	1.7	153.699	0.9
DAW–Uncompacted Bulk Materials	3,469.5	1.5	22.189	0.1
Other Dewatered Sludges	2,859.8	1.2	593.874	3.6
Incinerator Ash	1,442.6	0.6	2.380	0.0
Dewatered Filter Media	899.6	0.4	159.253	1.0
Cartridge Filters	892.0	0.4	141.021	0.9
Irradiated Reactor Components	862.0	0.3	1,590.668	9.7
Solidified Liquids	577.7	0.2	1,126.096	6.8
Biological Waste or Carcasses	65.8	0.0	0.002	0.0
Sealed Sources	58.8	0.0	1.144	0.0
Aqueous Liquids	37.3	0.0	12,675.058	76.9
DAW–Compacted Solids	18.6	0.0	0.001	0.0
Other Organic Liquids	0.8	0.0	0.078	0.0
TOTAL	246,700.9	100.0	16,481.130	100.0

The table shows that the majority of LLRW volume falls within the DAW category, which includes soils and building rubble contaminated with minute concentrations of radioactive material (also known as high volume, low activity waste), bulk materials such as paper, plastic, glass, and cloth, and solids such as wood, metal, concrete, and equipment. The majority of activity falls within the aqueous liquids category.

Table 7 shows the two organizations which contributed the highest volume and activity to the major waste categories shipped for disposal. Nearly 77% of the total activity shipped for disposal was contained in 37 cubic feet of aqueous liquids from Du Pont Medical Products in Boston, which manufactures radioactive tracers for use in medical research. This waste stream, produced every year as part of Du Pont's manufacturing process, consists of tritium-contaminated aqueous liquids that have been absorbed into a dry granular material prior to packaging for disposal at the Barnwell, South Carolina facility. Almost 92% of the total volume shipped for disposal consisted of high volume, low activity (HVLA) waste that came from the decommissioning/remediation activities at the Texas Instrument site in North Attleboro. This waste was disposed of at the Envirocare facility in Clive, Utah.

Table 7
Major 1996 LLRW Waste Categories Shipped for Disposal
(cubic feet and curies)

Waste Category	Waste Type	Organization	Volume	% of Total	Activity	% of Total
Aqueous Liquids	Process	Du Pont Medical Prod.	37	0.0	12,675.0	76.9
Soils/Building Rubble	Decommissioning	Texas Instruments	226,259	91.7	0.8	0.0
Remaining	N/A	N/A	20,405	8.3	3,805	23.1
TOTAL			246,701	100.0	16,481.0	100.0

Note: See Appendix A for a description of waste categories.

2.4.4 Classification and Disposal Site

Tables 8 and 9 summarize reported production and treatment data for 1996 LLRW shipped for disposal by 10 CFR 61 disposal class (see Appendix A for a discussion of disposal classifications). The largest volume was Class A LLRW shipped to the Envirocare facility. The majority of the activity reported was contained in Class B and Class C LLRW shipped to the Barnwell facility.

Table 8
Summary of 1996 LLRW Volume Shipped for Disposal – by Disposal Class
(cubic feet)

	Disposal Classification					
	Class A	Class AH	Class B	Class C	Total	% of Total
Produced	290,455.3	0.0	627.6	1,143.0	292,225.9	100.0
Eliminated by On–Site Treatment	10,401.0	0.0	0.0	0.0	10,401.0	3.6
Eliminated by Off–Site Treatment	35,124.0	0.0	0.0	0.0	35,124.0	12.0
Volume Reduction	45,525.0	0.0	0.0	0.0	45,525.0	15.6
Barnwell, South Carolina	11,197.5	0.0	627.6	1,143.0	12,968.1	4.4
Clive, Utah	232,224.9	0.0	0.0	0.0	232,224.9	79.5
Hanford, Washington	1,507.9	0.0	0.0	0.0	1,507.9	0.5
Shipped for Disposal	244,930.3	0.0	627.6	1,143.0	246,700.9	84.4

Table 9
Summary of 1996 LLRW Activity Shipped for Disposal – by Disposal Class
(curies)

	Disposal Classification					
	Class A	Class AH	Class B	Class C	Total	% of Total
Produced	101.042	0.000	14,581.825	1,798.264	16,481.131	100.0
Barnwell, South Carolina	96.172	0.000	14,581.825	1,798.264	16,476.260	100.0
Clive, Utah	3.443	0.000	0.000	0.000	3.444	0.0
Hanford, Washington	1.427	0.000	0.000	0.000	1.427	0.0
Shipped for Disposal	101.042	0.000	14,581.825	1,798.264	16,481.131	100.0

Figure 7 shows the volume and activity of LLRW shipped for disposal by disposal classification. The largest reported contributor to volume was Class A waste (99.3%), followed by Class C (0.46%) and then Class B (<0.3%). By activity, the largest reported contributor was Class B (88.5%), followed by Class C (10.9%), and then Class A (0.6%).

Figure 7
1996 LLRW Volume and Activity Shipped for Disposal – by Disposal Class
(percent)

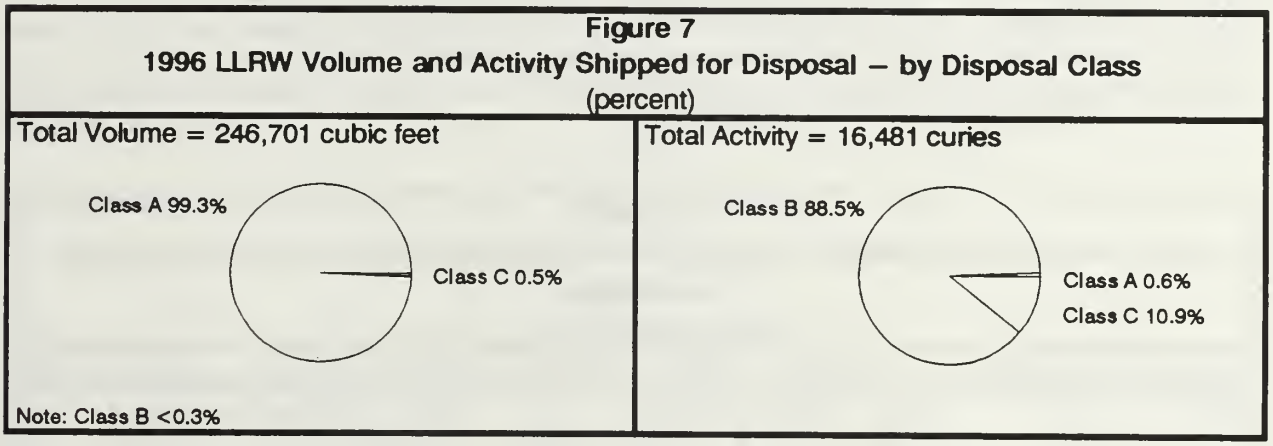


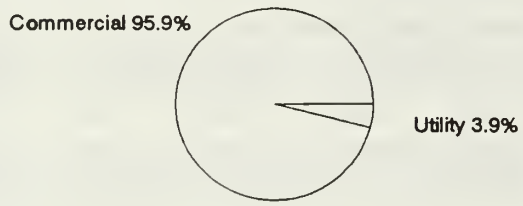
Figure 7 also illustrates the relationship between disposal class and activity of reported 1996 LLRW volume shipped for disposal. Class A waste, while being the largest class by volume, contained a small amount of activity. Class B waste, representing a small amount of volume contained the greatest amount of activity. Class C comprised a small amount of volume and a relatively small amount of activity.

2.4.5 Disposal Data by Generator Category

Figure 8 provides a breakdown of reported 1996 volume and activity shipped for disposal by generator category. The largest contributor to the 1996 disposal volume was the commercial category with 95.9%, followed by the utility category with 3.9%, and the academic, government, and health categories totaling less than 0.1% each. By activity, the largest contribution also came from the commercial category with 84.8%, followed by the utility category with 15.2%. Activity from the academic, government, and health categories totaled less than 0.1%.

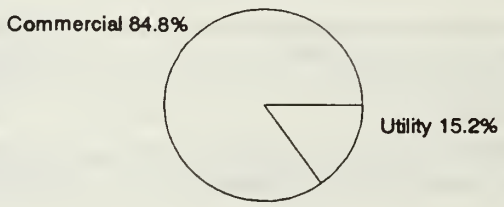
Figure 8
1996 LLRW Volume and Activity Shipped for Disposal – by Generator Category
(percent)

Total Volume = 246,701 cubic feet



Note: Academic, Government, and Health <0.1%.

Total Activity = 16,481 curies



Note: Academic, Government, and Health <0.1%.

Tables 10 and 11 present reported 1996 volume and activity received for disposal by disposal class and generator category. Massachusetts typically ranks among the top 15 LLRW producing states (see Table 20 in Chapter 4 of this report). The Commonwealth's waste stream is unique in that the commercial category usually ships more volume (and typically, activity) for disposal than other generator categories, whereas the utility category dominates volume and activity among the top ten LLRW producing states. There are two main reasons for this pattern. First, Massachusetts, with only one operating nuclear power plant, has a smaller nuclear power LLRW component than other large waste producing states. Second, Massachusetts is home to the Du Pont companies (within the commercial category), which are the largest manufacturers of radioactive compounds and radiopharmaceuticals in the country.

Table 10
1996 LLRW Volume Shipped for Disposal – by Disposal Classification and Generator Category
(cubic feet)

Disposal Class	Acad	Comm	Govt	Health	Utility	Total	% of Total
Class A	263.0	236,257.0	0.0	118.9	8,291.3	244,930.3	99.3
Class AH	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Class B	0.0	339.2	0.0	0.0	288.4	627.6	0.3
Class C	0.0	0.0	0.0	0.0	1,143.0	1,143.0	0.5
Shipped for Disposal	263.0	236,596.2	0.0	118.9	9,722.7	246,700.9	100.0

Table 11
1996 LLRW Activity Shipped for Disposal – by Disposal Classification and Generator Category
(curies)

Disposal Class	Acad	Comm	Govt	Health	Utility	Total	% of Total
Class A	1.334	36.360	0.000	0.823	62.525	101.042	0.6
Class AH	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Class B	0.000	13,936.214	0.000	0.000	645.611	14,581.825	88.5
Class C	0.000	0.000	0.000	0.000	1,798.264	1,798.264	10.9
Shipped for Disposal	1.334	13,972.573	0.000	0.823	2,506.400	16,481.130	100.0

2.5 1996 LLRW Shipping Information

This section provides packaging and shipping data on LLRW shipped for disposal during 1996. Data is presented on the number of pickups by shipment destination, package quantity segregated by destination, U.S. Department of Transportation (DOT) package type, container volume, and radiation level.

Tables 12 summarizes the total number of pickups for each generator category by shipment destination. "Direct" refers to packages shipped directly from the generator to the disposal facility. "Indirect" refers to packages shipped to out-of-state processing facilities for treatment prior to disposal.

Table 12
1996 LLRW Shipment Destination – by Generator Category
(number of pickups)

Shipment Destination	Generator Category					Total
	Acad	Comm	Govt	Health	Utility	
Direct	5	61	0	14	39	119
Indirect	14	27	0	21	28	90
Total	19	88	0	35	67	209

Table 13 summarizes the total number of containers shipped for disposal by each generator category by shipment destination.

Table 13
Number of Containers Shipped from Licensee Facilities in 1996 – by Generator Category and Destination
(number of packages)

Generator Category	Direct	Indirect	Total
Academic	7	91	98
Commercial	961	235	1,196
Government	0	0	0
Health	17	25	42
Utility	45	23	68
Total	1,030	374	1,404

Table 14 provides package data segregated into three types, based on DOT and NRC regulations: LSA or strong tight, Type A, and Type B. LSA, or Low Specific Activity, refers to packages containing low average concentrations of radioactivity, uniformly distributed. Type A and B package designations bear no correlation to NRC Class A and B disposal classifications.

LSA or strong tight packaging is designed to withstand normal transportation conditions. The limits on radioactive material quantities in an LSA package are such that any risks would be minimal if the material were dispersed during an accident. Type A packages are designed to withstand a higher level of stress (including rough handling); limits on radioactivity in these packages are such that there would be minimal effects on persons or the environment if the contents were dispersed during an accident. Type B packages are designed to withstand stress associated with accident conditions since the quantities of radioactive materials allowed would have a greater potential hazard than Type A materials.

Table 14
Number of Containers Shipped by Licensees in 1996 – by Package Designation and Generator Category
(number of packages)

Package Designation	Generator Category					Total
	Acad	Comm	Govt	Health	Utility	
LSA	13	850	0	1	67	931
Type A	86	299	0	41	0	426
Type B	0	47	0	0	0	47
Total	99	1,196	0	42	67	1,404

LLRW shipping and disposal containers vary in size from 5 to over 95 cubic feet. Table 15 shows the number and type of containers used to ship LLRW from licensees to processors or disposal sites during 1996. This table identifies the types of containers used to transport waste from the point of generation, and does not reflect the number of containers received at disposal facilities, since processors repackage LLRW prior to final shipment for disposal. The table shows that almost 90% of LLRW generators use the 55-gallon drum, which holds 7.5 cubic feet.

Table 15
Number of Containers Shipped by Licensees in 1996 – by Generator Category and Container Type

Generator Category	Container Volume				Total	% of Total
	30–Gal. Drum	55–Gal. Drum	89–Gal. Drum	Other[1]		
Academic	11	87	0	0	98	7.0
Commercial	13	1,089	0	95	1,197	85.3
Government	0	0	0	0	0	0.0
Health	0	40	0	2	42	3.0
Utility	20	45	0	2	67	4.8
Total	44	1,261	0	99	1,404	100.1
% of Total	3.1	89.8	0.0	7.1	100.0	

[1] Other includes: 83–, 85–, and 96–gallon containers; rail cars; components that acted as a container; and other miscellaneous containers.

Table 16 presents a distribution of the number of containers by typical external radiation level, measured prior to shipment from a licensee's premises. In 1996, most of the container radiation levels were between background and 1 millirem per hour. Background radiation, which varies naturally from location to location, is defined as the radiation level at a site exclusive of the contribution from NRC-licensed activities. Background radiation in the Boston area (not including indoor radon) is about 65 millirem per year. For comparison, according to the U.S. Environmental Protection Agency, the average annual dose to an individual from both natural and man-made sources of radiation combined is about 360 millirem per year.

Table 16
Number of Containers Shipped from Licensee Facilities in 1996 – by Generator Category and Radiation Level

Generator Category	Surface Radiation Level (millirem/hour)					
	Bkgd[1]	>Bkg–1	>1–10	>10–100	>100–1000	>1000
Academic	34	40	25	0	0	0
Commercial	240	845	69	38	4	0
Government	0	0	0	0	0	0
Health	0	42	0	0	0	0
Utility	2	0	20	45	0	0
Total	276	927	114	83	4	0
% of Total	19.7	66.0	8.1	5.9	0.3	0.0

[1] Bkgd means radiation levels external to the waste container are equivalent to background radiation at the point of shipment.

Table 17 presents a distribution of volume and activity shipped for disposal by radiation level measured external to a container prior to shipment from a licensee's premises. The table illustrates that radiation levels are not necessarily dependent upon the quantity of activity, but rather the type of radionuclide in the waste. For example, Class B absorbed liquids (within the "Bkgd" column) containing over 12,000 curies of tritium, emitted radiation at a level equivalent to background because tritium emits a low particle that cannot penetrate the waste container. The ">1000" millirem column includes irradiated hardware from the Yankee Rowe plant that contained radionuclides that emit high energy radiation at levels up to 4,700,000 millirem per hour. To minimize potential doses to workers and the public, high radiation packages are placed into special shielded containers, called overpacks, during transport to processors or disposal facilities.

Table 17
Distribution of 1996 LLRW Volume and Activity Shipped for Disposal – By Radiation Level
(cubic feet and curies)

Property	Surface Radiation Level (millirem/hour)					
	Bkgd[1]	>Bkg–<1	1–<10	10–<100	100–<1000	>1000
Volume	1,383.4	231,630.8	2,652.3	6,845.7	2,560.3	1,628.4
Volume %	0.6	93.9	1.1	2.8	1.0	0.7
Activity	13,947.490	20.851	3.800	16.758	40.217	2,452.014
Activity %	84.6	0.1	0.0	0.1	0.2	14.9

[1] Bkgd means radiation levels external to the waste container are equivalent to background radiation at the point of shipment.

2.6 Summary of Other LLRW Management Methods

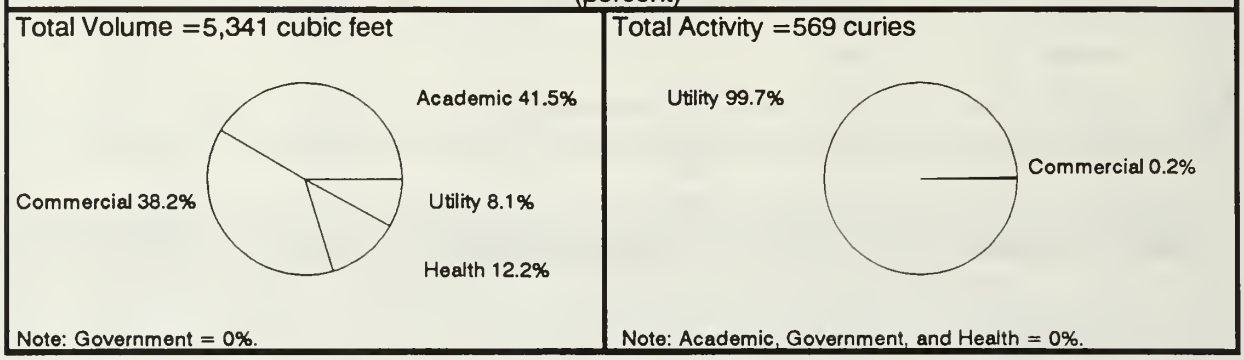
This section presents data for other individual management methods defined in Appendix A, reported by each generator category.

2.6.1 Incineration for Disposal

During 1996, 47 organizations managed 5,341 cubic feet of LLRW containing 569 curies by incineration

for disposal; of these, 4 organizations reported that they managed 1,496 cubic feet containing 0.145 curies of LLRW by incineration for disposal on their premises, and 43 organizations managed 3,845 cubic feet containing 568 curies of LLRW by shipping it for off-site incineration. Figure 9 illustrates the percentages of LLRW incinerated for disposal by each generator category.

Figure 9
1996 LLRW Volume and Activity Incinerated for Disposal– by Generator Category
(percent)

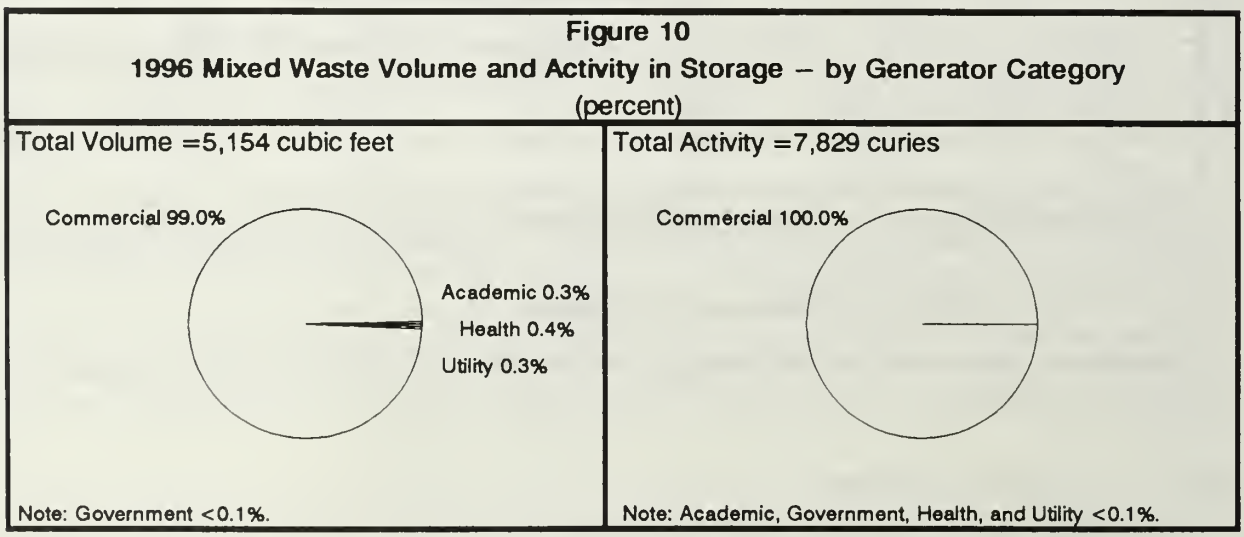


2.6.2 Mixed Waste Storage

During 1996, 20 organizations reported that they had mixed waste in storage on their premises. This included mixed waste generated during 1996 as well as mixed waste generated in previous years and placed into storage. LLRW generators stored this waste due to a nationwide lack of commercial mixed waste treatment and disposal capacity. Some mixed waste can be stored for decay to eliminate the radioactive element of the waste in order to dispose of it as non-radioactive hazardous waste, and some low-actvity mixed waste can be treated and disposed. Future volumes of mixed waste stored on site are expected to decline with new treatment capabilities opening up to generators from off-site processors.

Figure 10 illustrates the percentages of the 5,154 cubic feet of mixed waste containing 7,829 curies managed by on-site storage, reported by each generator category.

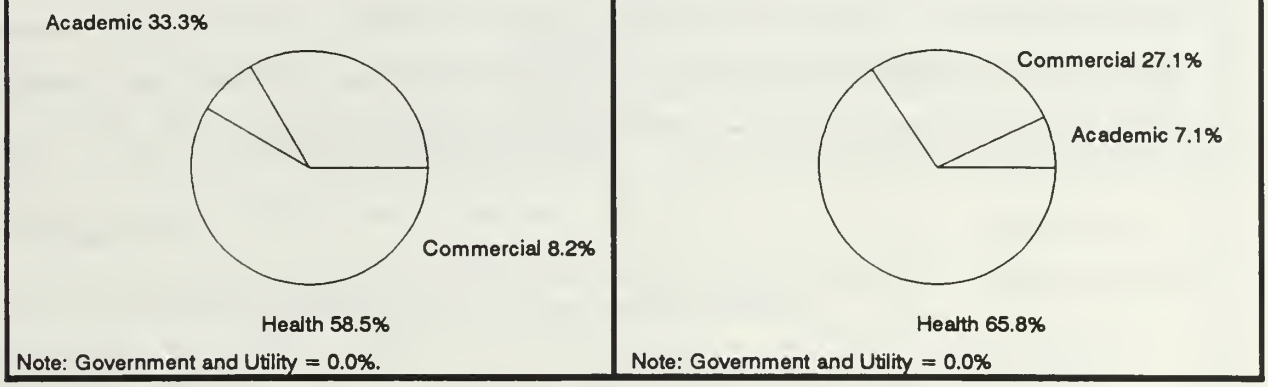
Figure 10
1996 Mixed Waste Volume and Activity in Storage – by Generator Category
(percent)



2.6.3 Specific Disposal

During 1996, 14 organizations reported that they managed LLRW by specific disposal. Figure 11 illustrates the percentages of 1,327 cubic feet of waste containing 0.095 curies, managed by this method, by each generator category.

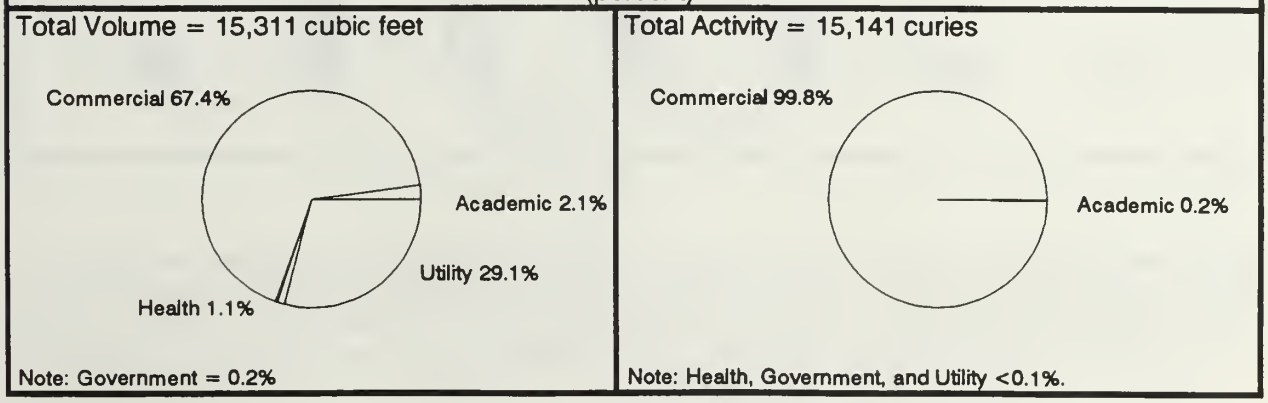
Figure 11
1996 Specific Volume and Activity Disposed – by Generator Category
(percent)



2.6.4 Storage

During 1996, 99 organizations reported that they managed LLRW, generated in 1996 and previous years, by placing it into storage (not including storage for decay or mixed waste storage). Of this number 97 organizations stored 14,624 cubic feet containing 15,090 curies on site, and 2 organizations stored 687 cubic feet containing 51 curies in off-site facilities. LLRW generators stored this waste for partial radioactive decay or to accumulate sufficient quantities for later disposal. Figure 12 illustrates the percentages of 15,311 cubic feet of LLRW containing 15,141 curies placed into storage, reported by each generator category.

Figure 12
1996 LLRW Volume and Activity in Storage – by Generator Category
(percent)



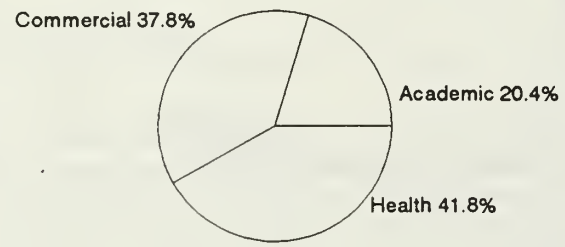
2.6.5 Storage for Decay

Figure 13 illustrates the percentages of total volume and activity reported in storage for decay on and off site by each generator category.

During 1996, 204 organizations reported that they managed 37,695 cubic feet of LLRW containing 2,772 curies by storage for decay. Of those, 191 organizations reported that they stored for decay 35,060 cubic feet of LLRW containing 2,697 curies on their premises. Thirteen organizations stored 2,635 cubic feet of LLRW containing 75 curies for decay off site at broker or processor facilities, due to lack of space at their own facilities.

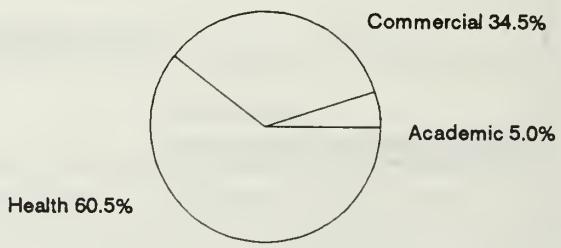
Figure 13
1996 LLRW Volume and Activity Managed by Storage for Decay – by Generator Category
(percent)

Total Volume =37,695 cubic feet



Note: Government and Utility <0.1%

Total Activity =2,772 curies



Note: Government and Utility <0.1%.

Chapter 3
LLRW Disposal Trends and Generator Projections

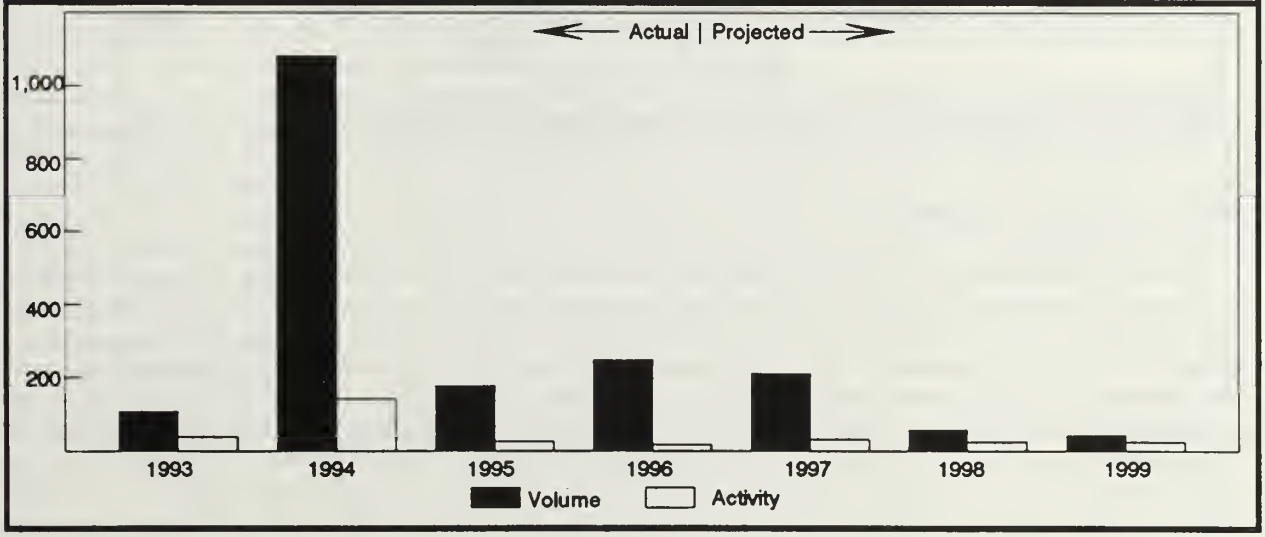
3.1 Historical and Projected Annual Disposal Rate Comparison

The Management Board is responsible for planning and effecting the management of LLRW in the Commonwealth. To aid citizens and policy makers, this chapter presents information on Massachusetts LLRW shipped for disposal to out-of-state licensed land disposal facilities, including trends in routine and non-routine LLRW shipped for disposal, and generator projections of the routine and non-routine volume and activity expected to require disposal capacity for the next three years.

In this chapter, trends and projections are discussed in terms of "routine" and "non-routine" LLRW shipped for disposal, based on the type of operations that produce the waste. "Routine" refers to LLRW from process operations that is expected to be generated annually for the foreseeable future. "Non-routine" refers to LLRW from one-time decommissioning or site remediation projects which not only can take several years to complete, but can significantly affect the total volume of LLRW shipped for disposal. Routine and non-routine LLRW combined represent the total amount of LLRW shipped to out-of-state licensed disposal facilities. The distinction between the two is made to illustrate the effect that non-routine LLRW can have on the total quantity of LLRW shipped for disposal.

Figure 14 shows how total LLRW shipped for disposal in 1996 compares to previous years and three years of projections as estimated by LLRW generators.

Figure 14
Historical and Projected LLRW Volume and Activity Shipped for Disposal
(cubic feet and curies–thousands)

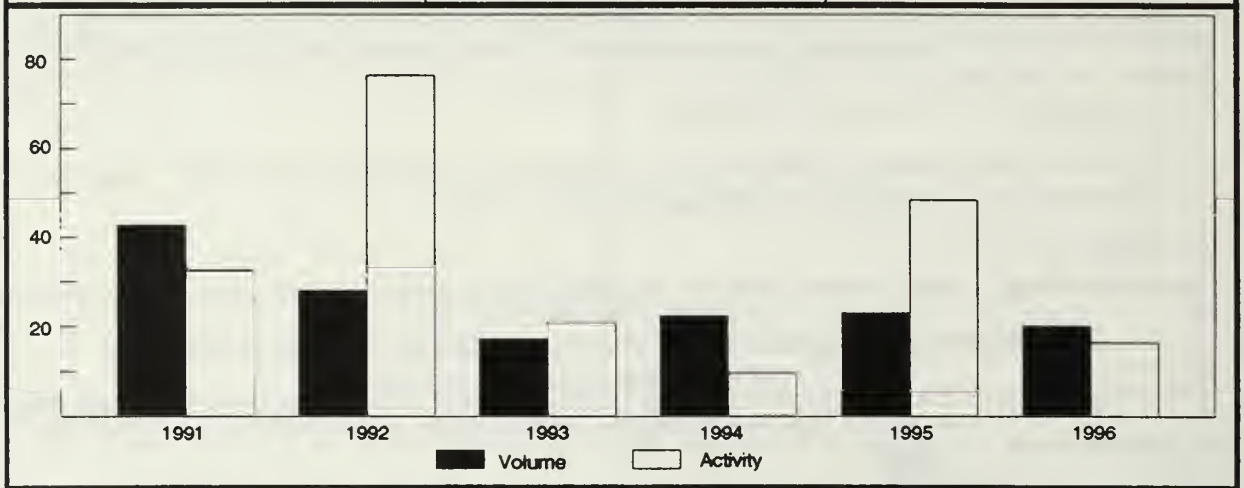


In 1996, Massachusetts generators shipped 39% more LLRW for disposal than in 1995. Disposed volume increased from 177,578 cubic feet in 1995 to 246,701 cubic feet in 1996. Activity decreased 37% from 26,150 curies in 1995 to 16,481 curies in 1996. Texas Instruments shipped 43% more HVLA waste in 1996, increasing the non-routine portion of total waste shipped for disposal. (See Section 2.4 of this report.)

3.2 Trends in Routine LLRW Shipped for Disposal

Figure 15 shows how 1996 routine LLRW shipped for disposal compares to previous years. Routine waste volume shipped for disposal in 1996 increased 51% from the previous year, when only 13,385 cubic feet of routine-generated LLRW was actually shipped for disposal in 1995[7]. The increase in 1996 routine waste shipped for disposal was influenced by the closure of the Barnwell facility during six months of 1995. During that time, many generators placed LLRW that required disposal into storage while Barnwell was inaccessible, and then shipped that waste along with the volumes generated in 1996.

Figure 15
Massachusetts Routine LLRW Volume and Activity Shipped for Disposal
1991–1996
(cubic feet and curies–thousands)



Note: 1994 and 1995 estimated from shipped and stored quantities due to Barnwell closure.

3.3 Generator Projections

As part of each year's survey, the Management Board asks LLRW generators to project what they will generate for three years into the future. However, because projections are based on factors known at the time they are made (i.e., the generator's views of the availability of disposal), and business activities can change dramatically, the Management Board understands that shifts can occur between projections and actual volumes and activity of waste requiring disposal in the future. Table 18 illustrates routine and non-routine projections made by Massachusetts generators for volume and activity to be shipped for disposal for the next three years.

[7] Since the Barnwell disposal facility was closed during the last half of 1994 and the first half of 1995, the amounts of routine LLRW that required disposal in 1994 and 1995 were estimated by determining the total LLRW shipped for disposal, subtracting non-routine waste and adding LLRW in storage which normally would have been shipped. The derived routine volumes and activities were used in Figure 15 for comparison purposes under normal circumstances.

Table 18
Generator Volume and Activity Projections for LLRW to be Shipped for Disposal – by Generator Category and LLRW Type

Generator Category/ LLRW Type	Volume (cubic feet)			Activity (curies)		
	1997	1998	1999	1997	1998	1999
Academic	92	101	112	0.1	0.1	0.1
Commercial	7,768	5,848	5,100	15,207.0	14,003.3	14,017.6
Government	8	8	8	0.0	0.0	0.0
Health	45	45	45	0.3	0.3	0.3
Utility	1,886	4,920	1,149	7,760.3	627.6	627.5
ROUTINE TOTAL	9,798	10,922	6,413	22,967.7	14,631.3	14,645.5
NON–ROUTINE TOTAL	93,400	40,000	0	45.0	20.0	0.0
TOTAL	103,198	50,922	6,413	23,012.7	14,651.3	14,645.5

Note: 1997 non–routine total consists of HVLA LLRW.

3.3.1 Routine LLRW

The Board calculates total projections based on normal on- and off-site volume reduction practices and on LLRW that has been placed into storage for future disposal, if an expected shipment date was provided by the generator. Assuming these volume reduction practices continue, projections from generators indicate that routine LLRW shipped for disposal will average just under 10,000 cubic feet over the next three years, with routine volume falling to well below 10,000 cubic feet by 1999.

However, since the Envirocare facility in Clive, Utah has expanded its acceptance criteria to receive more types of LLRW, and the Hanford and Envirocare facilities offer lower price disposal options in certain instances, some generators are utilizing these facilities without volume reducing their waste prior to disposal. If disposal costs for the Barnwell facility remain at an all-time high, and generators continue to utilize lower cost disposal options without volume reduction, routine LLRW volume disposal rates could continue their upward trend to the 20,000 to 30,000 cubic-foot-per-year level.

Activity within routine LLRW shipped for disposal has historically consisted primarily of a base component of tritium waste from Du Pont Medical Products and a variable component (every two to three years) of irradiated hardware from Pilgrim Station or Yankee Rowe (now closed). Due to the closing of Rowe, routine disposal activity has decreased several hundred curies per year. However, routine activity is expected to continue to fluctuate based upon the operating practices and timing of shipments by Du Pont Medical Products and Pilgrim Station.

3.3.2 Non-Routine LLRW

Generator projections indicate that LLRW from non-routine activities will inflate the total volume of LLRW shipped for disposal in 1997 and then will drop to zero by 1999. Non-routine projections indicate that Nuclear Metals, Inc. in Concord is expected to begin a remediation project in 1997 to clean up a holding basin on its property for depleted uranium and copper. Nuclear Metals projects it will ship to Envirocare of Utah 90,000 cubic feet of LLRW containing 45 curies in 1997, and 40,000 cubic feet containing 20 curies in 1998. American Annuity Group, Inc. expects to complete the decommissioning of the Sprague Company facility in North Adams in 1997, with a final shipment to Envirocare of 3,400 cubic feet containing 0.03 curies. With the dismantlement of the Rowe nuclear power plant nearly complete, projections from Yankee Atomic Electric Company indicate that only relatively small amounts of waste will continue beyond 1996 from routine operations at its environmental laboratory in Westborough and maintenance of its high-level radioactive waste (spent fuel) storage facility at Rowe.

3.3.3 Unknown Future Sources of LLRW in Massachusetts

In the future, LLRW from non-routine activities may be generated from the remediation or decommissioning of other facilities, some which may not be currently licensed. Major remediation projects expected to generate LLRW include Englehard Corporation in Plainville (contaminated soils) and Wyman-Gordon in Grafton (buried thorium waste). These projects are in various stages of planning so it is premature to speculate about the amounts of waste that could be generated; some radioactive material could be recycled, and the extent of the contamination is not yet known.

The Management Board will continue to monitor the decommissioning and remediation activities of all potential non-routine sources of LLRW to confirm and update its projections of Massachusetts LLRW requiring disposal.

Chapter 4
National Data

4.1 State-by-State Comparison

The following data was obtained from the U.S. Department of Energy National Low-Level Waste Management Program. The table shows how Massachusetts LLRW volume and activity shipped for disposal to the Barnwell, South Carolina, and Hanford, Washington disposal facilities compared to other states in 1996. These totals do not include high-volume, low-activity wastes shipped to the Envirocare facility in Clive, Utah, to which Massachusetts generators shipped 256,031 cubic feet containing 3.48 curies in 1996.

Table 19
1996 LLRW Volume and Activity Shipped for Disposal - by State

	Volume (cubic feet)	Activity (curies)		Volume (cubic feet)	Activity (curies)
Alabama	9,267.12	22,281.20	Missouri	2,916.99	150.40
Alaska	10.20	603.00	Montana	0.00	0.00
Arizona	9,329.27	16.09	Nebraska	5,013.28	32,750.85
Arkansas	571.42	303.22	Nevada	117.70	2.35
Army Out U.S.[8]	65.50	133.46	New Hampshire	2.32	0.00
California	12,070.78	3,474.76	New Jersey	15,805.16	906.65
Colorado	4,671.74	76.65	New Mexico	49.90	3.89
Connecticut	10,920.12	3,088.11	New York	16,228.39	1,312.36
Delaware	127.16	5.61	North Carolina	0.00	0.00
District of Columbia	164.80	0.47	North Dakota	4.10	0.03
Florida	6,220.33	1,417.70	Ohio	7,090.83	50,021.21
Georgia	13,405.88	122,519.67	Oklahoma	151.70	0.43
Hawaii	1,572.03	1.06	Oregon	52,082.40	356.74
Idaho	0.00	0.00	Pennsylvania	24,154.38	71,900.54
Illinois	51,771.22	57,328.05	Rhode Island	91.13	0.29
Indiana	328.98	9.61	South Carolina	10,273.10	2,347.13
Iowa	3,639.22	552.04	South Dakota	0.00	0.00
Kansas	1,185.15	3,995.76	Tennessee	41,312.95	644.86
Kentucky	441.83	462.29	Texas	4,886.60	3,941.45
Louisiana	5,377.80	799.47	Utah	4,924.50	0.26
Maine	3,499.40	477.12	Vermont	562.60	45.77
Maryland	3,391.05	349.13	Virginia	17,663.13	10,375.11
Massachusetts	**10,756.09[9]**	**16,627.51**	Washington	33,696.09	630.63
Michigan	24,951.04	41,906.96	West Virginia	34.77	0.11
Minnesota	3,215.22	1,406.00	Wisconsin	2,396.65	153.07
Mississippi	5,600.72	2,817.54	Wyoming	0.50	13.21
			TOTAL	**422,013.24**	**456,209.82**

[8] Army Out U.S. is U.S. owned military bases located outside the continental United States.

[9] Data presented in this table show a lower 1996 disposal volume for Massachusetts than the rest of this report. This table does not include LLRW shipped to the Clive, Utah disposal facility. The difference may also be due to generators reporting estimated volumes prior to volume-reducing treatment.

4.2 LLRW Shipped for Disposal in 1996 by Top Ten States

Table 20 shows the volume and activity of the top ten states that shipped LLRW for disposal in 1996. Massachusetts ranked fourteenth in volume and eighth in activity shipped for disposal. Approximately 85% of the activity shipped came from Du Pont Medical Products, which manufactures radioactive tracers for use in medical and life sciences research. Almost 100% of the activity shipped by Du Pont Medical Products came from tritium, an isotope of hydrogen which has a half-life of 12.5 years.

Table 20
1996 LLRW Volume and Activity Shipped for Disposal - by Top Ten States

	Volume (cubic feet)	Activity (curies)		Activity (curies)	Volume (cubic feet)
Oregon	52,082.40	356.74	Georgia	122,519.67	13,405.88
Illinois	51,771.22	57,328.05	Pennsylvania	71,900.54	24,154.38
Tennessee	41,312.95	644.86	Illinois	57,328.05	51,771.22
Washington	33,696.09	630.63	Ohio	50,021.21	7,090.83
Michigan	24,951.04	41,906.96	Michigan	41,906.96	24,951.04
Pennsylvania	24,154.38	71,900.54	Nebraska	32,750.85	5,013.28
Virginia	17,663.13	10,375.11	Alabama	22,281.20	9,267.12
New York	16,228.39	1,312.36	Massachusetts	16,627.51	10,756.09
New Jersey	15,805.16	906.65	Virginia	10,375.11	17,663.13
Georgia	13,405.88	122,519.67	Kansas	3,995.76	1,185.15

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Appendix A
About LLRW and Definitions

A.1 Sources and Types of LLRW

LLRW is radioactive material that (1) is neither high-level radioactive waste, nor spent fuel, nor uranium mill tailings, and (2) is classified by NRC as LLRW. It does not include waste which remains a federal responsibility, such as that owned or generated by the U.S. Department of Energy, the U.S. Navy as a result of decommissioning Navy vessels, or by the federal government as a result of any research, development, testing, or production of any atomic weapon.

LLRW is generated as a by-product of various uses of radionuclides. Typical applications include:

(1) the production of electricity by a nuclear power plant;

(2) the production and end-use of radiopharmaceuticals for medical procedures such as cancer and thyroid dysfunction diagnosis and treatment, radioimmunoassay, and diagnostic imaging examinations;

(3) research and development in the life-science and biotechnology industry for the treatment and prevention of various diseases and medical dysfunctions, and in the environmental field to study the effects of chemicals on plant and aquatic life, and for ocean studies;

(4) commercial uses such as within instruments that measure level, thickness, and density or that are used in moisture analysis and quality control; sealed sources that are used for industrial radiography of pressure vessels and other structural welds; smoke detectors and exit signs in buildings and commercial aircraft; and

(5) university education and research in medicine, materials science, and biotechnology.

LLRW takes a variety of forms and includes: radioactively contaminated dry, solid wastes such as wood, clothing and metal; concentrates from evaporation processes; hardware that has been irradiated and activated as a result of proximity to certain nuclear radiation sources; filters and filter media used in purifying various process streams; ion exchange resins used in water purification and chemical extraction processes; contaminated aqueous and organic liquids used in various analytical procedures and decontamination processes; contaminated used oils from machinery and processes that use radioactive materials; contaminated soil and rubble from the decommissioning and remediation of various facilities; biological waste such as animal carcasses and tissues from biological and medical research and medical diagnosis and treatment; and sludges from various processes.

Types of materials that typically comprise the LLRW stream in Massachusetts, the categories of generators producing each type, frequently used treatment processes, and the kinds of containers used for storage and disposal are summarized in Table A-1.

A.2 Federal Regulations Pertaining to Radioactive Materials Licensees

Radioactive materials licensees are regulated by the NRC under Title 10 of the Code of Federal Regulations (CFR). Several of the Chapters (known as Parts) of Title 10 are referenced in this report. Part 20 of Title 10 (10 CFR 20) pertains to standards to protect against radiation hazards and contains regulations for the disposal of wastes containing NRC licensed materials (Subpart K); Part 35 (10 CFR 35) pertains to

medical uses of byproduct material; Part 61 (10 CFR 61) pertains to land disposal of low-level radioactive waste, and Part 71 (10 CFR 71) regulates packaging and transportation.

On March 21, 1997, Massachusetts became an Agreement State with the Nuclear Regulatory Commission (NRC). Under the Agreement, NRC transferred responsibility for licensing the use of (1) radioactive materials produced as byproducts of the operation of nuclear reactors; (2) uranium and thorium source materials; and (3) small quantities of fissionable materials to the Massachusetts Department of Public Health (DPH) Radiation Control Program. NRC retains jurisdiction over regulation of nuclear reactors, federal agencies which use nuclear materials, and companies which distribute such materials (i.e., smoke detectors) to the public. Massachusetts established compatable regulations for the control of radioactive material. These regulations are contained in 105 CMR 120 Massachusetts Regulations for the Control of Radiation.

Table A-1
Typical LLRW Categories, Treatment, and Packaging

Waste Category	Generator Categories Typically Producing Waste[1]	Typical Treatment Used	Typical Storage and/or Disposal Containers[2]
Dry Active Waste (DAW)-Solids (Compacted/Uncompacted) metal, concrete, wood, equipment	Commercial, Academic, Health, Government, Utility	none, decontamination, segregation, sorting, recycle, decay	55- and 30- gallon steel drums, steel boxes
Dry Active Waste (DAW)-Bulk (Compacted/Uncompacted) paper, cloth, glassware, plastic, wood, soil	Commercial, Academic, Health, Government, Utility	compaction, incineration, segregation, sorting, decay	55- and 30- gallon steel drums, steel boxes, steel cargo vans, plastic boxes
Dry Active Waste (DAW)- Soils/Building Rubble	Commercial, Government	none	Rail cars, large bulk containers
Cartridge Filters for Liquids	Academic, Utility	none, dewatering, solidification	55- and 30- gallon steel drums, steel boxes, HIC[3]
Granular/Fiber Filter Media for Liquids	Commercial, Utility	dewatering to < 0.5% free water by volume	55-gallon steel drums, steel liners,[4] HIC
Activated Hardware control rods, in-core instruments, structural materials	Academic, Utility	size reduction	55-gallon steel drums, steel liners, HIC
Contaminated Hardware	Commercial, Academic, Health, Government, Utility	none, decontamination, decay	55- and 30- gallon steel drums, steel boxes
Ion Exchange Resins (Solidified)	Commercial, Utility	solidification	55-gallon steel drums, steel liners, HIC
Ion Exchange Resins (Dewatered)	Commercial, Academic, Utility	dewatering to < 0.5% free water by volume	55-gallon steel drums, steel liners, HIC
Contaminated Aqueous Liquids	Commercial, Academic, Health, Government	solidify, decay, sewerage disposal[5]	55- and 30- gallon steel drums
Contaminated Oils/Lubricants	Commercial, Utility	incineration, solidification, absorption	55- and 30- gallon steel drums, steel liners
Other Contaminated Organic Liquids	Commercial, Academic, Health, Government, Utility	encapsulation as absorbed, incineration, decay	Incinerated or stored in 55- and 30-gallon steel drums
Biological Waste or Carcasses	Commercial, Academic, Health	incineration, packaged with absorbents and lime	55- and 30- gallon steel drums, steel boxes, HIC
Depleted Uranium Sludges and Metals	Commercial	recycling, solidification	55-gallon steel drums, steel boxes

[1] Not all waste streams, processes, or containers appear in a given year or from a specified generator category each year.

[2] Other containers used less frequently include small steel pails or cans in the ½-to-5-gallon size and 9-to-10-cubic feet fiber drums used as temporary containment vessels prior to processing, such as incineration (where the fiber drum is incinerated also).

[3] "HIC" means High Integrity Container, designed to withstand the effects of disposal for a minimum of 300 years.

[4] "Steel liners" are typically large cylindrical vessels ranging in capacity from 50-to-215-cubic feet.

[5] NRC regulations (10 CFR 20) permit the discharge into sanitary sewerage systems of liquids, generated incidental to operations, containing minute concentrations of certain radionuclides.

A.3 Waste Classification System and Definitions

A.3.1 Waste Classification System

Modern LLRW disposal facility design criteria integrate several technical requirements, including suitable site geology, appropriate design, and waste classification and segregation, into a system designed to achieve specific performance goals. These include protection of individuals during operations, protection of the general public from release of radioactivity, protection of individuals from inadvertent intrusion, and stability of the disposal site after closure. States can and have imposed additional requirements for LLRW disposal which exceed the NRC minimum performance requirements.

A cornerstone of NRC's approach to disposal facility design is the waste classification system. This system is a concentration-based approach to limit the type and quantity of radionuclides within radioactive waste classified as LLRW, so it can be safely managed by near-surface land disposal systems.

Class A wastes are characterized by their low concentrations of long-lived radionuclides and concentrations of short-lived radionuclides that will decay to acceptable levels within a 100-year institutional control period when a disposal facility is actively maintained after closure. These concentration limits, specified in 10 CFR 61, have been calculated on the basis of dose limits to an individual who might inadvertently intrude, occupy the disposal site, and encounter waste after this time.

Class B wastes are the next level of wastes that could represent a potential hazard to an inadvertent intruder, without additional protective measures, since they contain higher concentrations of short-lived and long-lived radionuclides. They must meet the NRC's minimum stability requirements so that the waste forms or containers can "maintain gross physical properties and identity, over 300 years" (10 CFR 61.7(b)(2)), thus limiting the exposure to a potential intruder.

Class C wastes contain greater concentrations of long-lived or short-lived radionuclides that must meet more stringent waste form requirements to ensure stability and must be disposed of in such a way to protect the inadvertent intruder for a longer period of time. These wastes must meet the stability requirements for form or container (300 years) and must be disposed of in a manner which protects against inadvertent intrusion for at least 500 years (10 CFR 61.7(b)(5)).

Greater than Class C (GTCC) wastes have larger concentrations of radionuclides which make them unacceptable for near-surface land disposal, unlike Classes A, B, and C.

Radioactive waste that meets the concentration limits of 10 CFR 61 is termed "low-level" because it contains lower concentrations of long- and short-lived radionuclides as compared to spent nuclear fuel, which is termed "high-level." High-level radioactive wastes (HLRW), like GTCC wastes, contain concentrations of long- and short-lived radionuclides that make them unsuitable for management by near-surface disposal. HLRW and GTCC wastes remain the responsibility of the federal government, and the present federal strategy for HLRW management is deep geologic disposal.

The purpose of the classification system is to limit the radiation hazard to individuals who may encounter waste after the institutional control period. While the classification system does allow long-lived radionuclides in LLRW that may also appear in HLRW, their concentrations within Classes A, B, and C are limited so that the potential radiation dose (hazard) to inadvertent intruders or members of the general public will be acceptably low and within the limits of 10 CFR 61.

A.3.2 Definitions

Byproduct material: Any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material. Byproduct material also refers to the tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content.

Eliminated by treatment: The reduction in volume that occurs as a result of any treatment method such as compaction or incineration.

Incineration for disposal: A procedure where certain designated LLRW and mixed waste streams are incinerated by NRC licensees (either on site or off site by processors), instead of being shipped to a licensed LLRW disposal facility.

10 CFR 20 allows incineration for disposal of certain waste forms containing specific amounts of radioactivity. Waste forms allowed to be incinerated are animal carcasses used in research and liquid scintillation fluids (incinerated as fuel), although it is possible for a licensee to petition NRC for a license amendment to incinerate for disposal other waste forms, such as dry active wastes. Regulations limit the specific activity of this waste to 0.05 microcuries per gram of material of Hydrogen-3 (tritium) or Carbon-14.

Incineration for disposal is different from volume reduction (defined below) because 90% of the tritium and 75% of the Carbon-14 are released to the atmosphere via combustion gasses. Typically the residual ash remaining after incineration, if any, does not require management as LLRW.

Liquid Scintillation Waste (LSF/V): Vials of scintillation liquids or "cocktails" are used extensively in medical research, as well as in commercial research. The scintillation liquids consist of organic fluids (usually toluene, zylene or benzene) packaged in plastic or glass vials. Scintillation vials usually contain extremely small quantities of radioactive material. Reseachers traditionally divide one millicurie of tritium into 10 or more cell studies, using only a part of any one cell study in a given scintillation vial. This action dilutes the radioactive hazard of the vials, but means more vials are produced requiring treatment and disposal.

Management of LLRW: The storage, packaging, treatment, transportation, or disposal, where applicable, of low-level radioactive waste.

Mixed Waste: LLRW containing material that is (1) listed as hazardous material in regulations of the Massachusetts Department of Environmental Protection or the U.S. Environmental Protection Agency, or (2) causes the waste to exhibit any of the characteristics (ignitability, corrosivity, reactivity, toxicity) identified in regulations of the DEP or EPA. In Massachusetts, mixed waste is classified using the same NRC LLRW disposal classifications listed above with the addition of an "H" for "hazardous" after the classification letter (i.e., Class AH, Class BH, etc.).

Mixed waste storage: Disposal options for mixed waste are limited and depend upon waste form and radionuclide concentration. One option is the Clive, Utah facility operated by Envirocare. This site, however, only accepts LLRW with very low activity levels. Mixed waste shipped to Envirocare appears in the "shipment for disposal" category. Another option is incineration as fuel, although this option is limited to the waste forms and activity described above in the "incineration for disposal" category. Mixed waste that cannot be disposed of by these options must be placed in storage pending future development of treatment or disposal capacity, and appears in the "mixed waste storage" category.

Naturally-occurring or Accelerator-produced Radioactive Material (NARM): Radioactive material and waste that is divided into two types: (1) "discrete" material and waste (low volume, high activity accelerator produced materials, radium needles used in medicine, and drinking water filters from radium-contaminated

areas); and (2) "diffuse" material (generally lower activity radium-contaminated soil at locations where radium was used for manufacturing luminous dials and paint or where natural deposits of radium exist, or material in which radium or other naturally-occurring materials have been concentrated). NARM waste is not regulated by the NRC, but is regulated by the Commonwealth.

Sealed source: Radioactive material that is encased in a capsule designed to prevent leakage or escape of the radioactive material. Sealed sources usually are returned to the manufacturer for recycling or disposal.

Shipment for disposal: LLRW delivered directly, or via a processor, to an NRC-licensed disposal facility.

Source material: Uranium or thorium or any combination of uranium and thorium in any physical or chemical form; or any radioactive material (except special nuclear material) that contains 0.05% or more of uranium, thorium, or any combination of the two.

Special nuclear material: Plutonium, Uranium-233, Uranium-235, or any other material artificially enriched by the foregoing or so designated by the NRC. Special nuclear material does not include source material.

Specific disposal: Disposal of licensed material (identical to the waste forms and quantities listing in "incineration for disposal" above and by methods other than incineration) as if it were not radioactive.

Storage: The holding of LLRW in storage that was generated during the survey year or prior years. Reasons for storage include consolidation prior to shipment, partial radioactive decay prior to final packaging for disposal, or lack of disposal availability. Since the waste may be treated, or undergo additional radioactive decay prior to final packaging for disposal, reported volume and activity may not reflect actual disposal properties. LLRW in storage for decay (described below) or mixed waste storage is not included in this category.

Storage for decay: A procedure in which LLRW with a relatively short half-life is held for natural radioactive decay (at least 10 half-lives) in compliance with applicable federal and state regulations. At the end of the storage period, the waste is effectively no longer radioactive and, after radiation monitoring, it can be disposed of as normal trash. Massachusetts law (Chapter 111H) defines storage for decay as a treatment method.

Each NRC license specifies the physical half-lives of radionuclides that may be stored for decay by the licensee. Typically, NRC will authorize storage for decay of radionuclides with less than 90-day half-lives. Since many radionuclides used by licensees in Massachusetts have half-lives less than 90 days, storage for decay is a common practice.

Volume reduction: The reduction in LLRW volume that occurs due to processing, either on or off site where the waste was generated, prior to final packaging for shipment to a licensed LLRW disposal facility. Typical volume reduction techniques include: sorting and segregating (the separation of non-radioactive material from the radioactive portion of LLRW); compaction (a process using a hydraulic or mechanically driven press which compresses materials into a smaller volume prior to disposal); supercompaction (compaction using compression forces approaching 100 times those achieved with standard compactors); incineration (a process for reducing LLRW volume by burning); and decontamination (the removal of radioactive contaminants from surfaces or equipment, using methods such as washing, electropolishing, abrasive cleaning, or cleaning with high pressure water).

Appendix B
Massachusetts LLRW Producer Information

Table B–1
1996 LLRW Management Summary – by County
(number of organizations)

County	Produced	On–Site Treatment	Storage for Decay[1]	Incineration for Disposal[1]	Off–Site Treatment	Shipment for Disposal	Storage[2]
Barnstable	7	1	7	1	1	2	2
Berkshire	6	0	5	0	0	1	2
Bristol	7	0	5	0	0	1	2
Dukes	0	0	0	0	0	0	0
Essex	12	0	8	1	2	3	3
Franklin	0	0	0	0	0	0	0
Hampden	8	0	7	0	1	1	1
Hampshire	5	1	5	0	1	1	2
Middlesex	99	17	78	17	16	28	38
Nantucket	0	0	0	0	0	0	0
Norfolk	15	0	13	0	1	2	5
Plymouth	8	2	4	2	1	3	1
Suffolk	33	8	33	19	12	16	14
Worcester	25	3	20	4	5	9	11
TOTAL	225	32	185	44	40	67	81

[1] On and off–site totals combined.

[2] Storage of LLRW produced during 1996 or retained from prior years.

Table B–2
1996 LLRW Volume and Activity Shipped for Disposal – by County

County	Volume (cubic feet)	% of Total	Activity (curies)	% of Total
Barnstable	11.25	0.0	0.005	0.0
Berskire	41.6	0.0	0.008	0.0
Bristol	226,258.7	91.7	0.766	0.0
Dukes	0.0	0.0	0.0	0.0
Franklin	0.0	0.0	0.0	0.0
Essex	55.0	0.0	5.766	0.0
Hampden	96.3	0.0	0.711	0.0
Hampshire	3.0	0.0	0.002	0.0
Middlesex	8,607.8	3.5	7.023	0.0
Nantucket	0.0	0.0	0.0	0.0
Norfolk	1,636.7	0.7	636.578	3.9
Plymouth	33.0	0.0	0.007	0.0
Suffolk	1,599.5	0.6	13,959.593	84.7
Worcester	8,358.1	3.4	1,870.672	11.4
TOTAL	246,700.9	100.0	16,481.130	100.0

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996

County[1]	City	Organization	Radioactive Material Use Code (Decriptions of codes are at the end of this table)
Barnstable	Falmouth	Falmouth Cardiology Assoc., P.C.	20
Barnstable	Falmouth	Falmouth Hospital	20
Barnstable	Hyannis	Cape Cod Hospital	20, 21
Barnstable	Hyannis	Heart Center	25, 26
Barnstable	Hyannis	Hyannis Heart Associates, Inc.	Data not provided
Barnstable	Woods Hole	Marine Biological Laboratory	45, 74
Barnstable	Woodshole	Woods Hole Oceanographic Institution	74, 40, 50, 37, 66
Berkshire	Great Barington	Fairview Hospital	20, 25
Berkshire	North Adams	American Annuity Group	74
Berkshire	North Adams	North Adams Regional Hospital	20
Berkshire	Pittsfield	Berkshire Medical Center	20
Berkshire	Pittsfield	Hillcrest Hospital	20
Berkshire	Williamstown	Williams College	45, 41, 42
Bristol	Attleboro	Mallinckrodt Medical, Inc.	25
Bristol	Attleboro	Sturdy Memorial Hospital	25, 26, 24, 20
Bristol	Attleboro	Texas Instruments	74 – Site Remediation
Bristol	Fall River	Charlton Memorial Hospital	25, 20, 21
Bristol	New Bedford	St. Luke's Hospital	25
Bristol	Norton	Wheaton College	45
Bristol	Taunton	Morton Hospital & Medical Center	20, 24, 25, 21
Essex	Andover	Eisai Research Institute	45, 41, 25
Essex	Beverly	Beverly Hospital	20, 21
Essex	Beverly	Communication & Power Industries	74
Essex	Beverly	New England Biolabs, Inc.	45, 31
Essex	Danvers	Amicon, Inc.	42
Essex	Gloucester	Addison Gilbert Hospital	20
Essex	Haverhill	Hale Hospital	20, 21
Essex	Lynn	Atlanticare Medical Center	20, 21
Essex	Marblehead	T.R. Wilbury Laboratories, Inc.	41, 40
Essex	Newburyport	Anna Jaques Hospital	20, 24, 25, 26
Essex	North Andover	R T S Technology Inc.	23, 09
Essex	Salem	E G & G	74
Hampden	Chicopee	Our Lady Of The Elms College	45, 74 – Student Training
Hampden	Holyoke	Holyoke Hospital	20, 21
Hampden	Holyoke	Providence Hospital	20, 21
Hampden	Palmer	Wing Memorial Hospital	20, 21
Hampden	Springfield	Baystate Medical Center	20, 27, 21
Hampden	Springfield	Cameo Diagnostic Center, Inc.	20

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996 (Continued)

County[1]	City	Organization	Radioactive Material Use Code (Decriptions of codes are at the end of this table)
Hampden	Springfield	INS Corporation	74 – Laundering of Protective Clothing
Hampden	Springfield	Mercy Hospital	20, 21
Hampshire	Amherst	Amherst College	45, 42
Hampshire	Amherst	University Of Massachusetts	45, 38, 35, 60, 53
Hampshire	Northampton	Cooley Dickinson Hospital	20
Hampshire	Northampton	Smith College	45
Hampshire	South Hadley	Mount Holyoke College	45, 42
Middlesex	Ashland	Kidde–Fenwal, Inc.	17
Middlesex	Ayer	Deaconess–Nashoba Hospital	20, 21
Middlesex	Bedford	CIS–US, Inc.	25, 27, 20
Middlesex	Bedford	Collaborative Biomed. Products, Inc.	45
Middlesex	Bedford	VA Hospital (ENRM)	45, 31, 25
Middlesex	Billerica	Du Pont Merck Pharmaceutical Co.	74 – Manufacturing of Radiopharmaceuticals
Middlesex	Billerica	Eurotherm Gauging Systems, Inc.	5
Middlesex	Billerica	E.I. Du Pont De Nemours & Co.	74 – Manufacturing of Radiopharmaceuticals
Middlesex	Billerica	E.I. Du Pont De Nemours & Co.	74 – Manufacturing of Radiopharmaceuticals
Middlesex	Burlington	Amersham Corporation	74
Middlesex	Burlington	Lahey Hitchcock Medical Center	20, 23, 25, 19
Middlesex	Cambridge	Advanced Magnetics	45
Middlesex	Cambridge	Alkermes Incorporated	45
Middlesex	Cambridge	Ariad Pharmaceuticals, Inc.	31
Middlesex	Cambridge	Biodevelopment Laboratories, Inc.	45, 41, 31, 30
Middlesex	Cambridge	Biogen, Inc.	45
Middlesex	Cambridge	Boston Heart Foundation	20, 31
Middlesex	Cambridge	Cambridge Neuroscience Research	45
Middlesex	Cambridge	Chemgenics Pharmaceuticals, Inc.	42, 41
Middlesex	Cambridge	Cubist Pharmaceuticals, Inc.	45
Middlesex	Cambridge	Cytomed, Inc.	45
Middlesex	Cambridge	Dyax Corp.	45
Middlesex	Cambridge	Exelixis Pharmaceuticals, Inc.	45, 42
Middlesex	Cambridge	Genetics Institute	45, 42
Middlesex	Cambridge	Genzyme Corporation	45, 42, 41
Middlesex	Cambridge	Harvard University	45, 20
Middlesex	Cambridge	Immunogen, Inc.	45
Middlesex	Cambridge	Leukosite, Inc.	45, 42
Middlesex	Cambridge	Massachusetts Institute of Technology	45, 42, 66, 41, 31
Middlesex	Cambridge	Metabolix, Inc.	42
Middlesex	Cambridge	Millennium, Inc.	42, 45

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996 (Continued)

County[1]	City	Organization	Radioactive Material Use Code (Decriptions of codes are at the end of this table)
Middlesex	Cambridge	Mitotix, Inc.	45, 42, 41
Middlesex	Cambridge	Mt. Auburn Hospital	20, 21, 19
Middlesex	Cambridge	Omnigene Bioproducts, Inc.	45, 27
Middlesex	Cambridge	Omnigene Diagnostics, Inc.	Data not provided
Middlesex	Cambridge	Oncogene Science, Inc.	45, 31
Middlesex	Cambridge	Ontogeny, Inc.	31
Middlesex	Cambridge	Pangaea Pharmaceuticals, Inc.	Data not provided
Middlesex	Cambridge	Pharmaceutical Peptides, Inc.	45, 42, 41, 43
Middlesex	Cambridge	Procept, Inc.	45, 42, 41
Middlesex	Cambridge	Proscript, Inc.	45, 41
Middlesex	Cambridge	Repligen Corporation	42, 45
Middlesex	Cambridge	Shared Diagnostics Services	20
Middlesex	Cambridge	Transkaryotic Therapies, Inc.	31
Middlesex	Cambridge	Vertex Pharmaceuticals	45
Middlesex	Cambridge	Virus Research Institute	31
Middlesex	Cambridge	Whitehead Inst. For Biomedical Res.	42, 45
Middlesex	Cambridge,	Metasyn, Inc.	30, 45, 25, 19
Middlesex	Chestnut Hill	Boston College	45, 67, 41, 66, 48
Middlesex	Concord	Emerson Hospital	20, 21
Middlesex	Concord	Nuclear Metals, Inc.	71
Middlesex	Concord	Oxford Analytical, Inc.	8
Middlesex	Everett	Whidden Memorial Hospital	20
Middlesex	Framingham	Metrowest Medical Center	20
Middlesex	Hopkinton	Creative Biomolecules, Inc.	45
Middlesex	Hopkinton	Seragen, Inc.	45
Middlesex	Lexington	Focal, Inc.	45
Middlesex	Lexington	Fuji Immunopharmaceuticals Corp.	31
Middlesex	Lexington	Sandoz Chemicals Biotech. Res. Corp.	42
Middlesex	Lexington	W.R. Grace & Co.	45, 27
Middlesex	Lowell	Saints Memorial Medical Center	20, 21
Middlesex	Lowell	University Of Massachusetts–Lowell	74 – DNA, Nutrition, Synthesis of Compounds; 77
Middlesex	Malden	Charm Sciences, Inc.	45
Middlesex	Malden	Malden Hospital	20
Middlesex	Marlborough	A L G Company	45
Middlesex	Marlborough	Marlborough Hospital	20, 25
Middlesex	Maynard	NMC Diagnostic Services, Inc.	20
Middlesex	Medford	Lawrence Mem. Hospital Of Medford	20, 21
Middlesex	Medford	Scriptgen Pharmaceuticals, Inc.	45

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996 (Continued)

County[1]	City	Organization	Radioactive Material Use Code (Decriptions of codes are at the end of this table)
Middlesex	Medford	Tufts University	45
Middlesex	Melrose	Melrose/Wakefield Hospital	20
Middlesex	Milford	Millipore Corporation	1, 15, 67, 5
Middlesex	Natick	U.S. Army SSCOM	31, 27, 42, 45
Middlesex	Newton	Cellcor, Inc.	27, 44
Middlesex	Newton	H N U Systems, Inc.	8, 67, 69
Middlesex	Newton	Matritech, Inc.	45
Middlesex	Newton	Newton–Wellesley Hospital	20, 21
Middlesex	Somerville	Somerville Hospital	20
Middlesex	Stoneham	Boston Regional Medical Center	20
Middlesex	Sudbury	Raytheon Company–Elec. Sys. Div.	74 – Radiation Hardness Testing
Middlesex	Waltham	Assoc. Radiologists of Boston, Inc.	20, 25, 24
Middlesex	Waltham	Brandeis University	42, 45
Middlesex	Waltham	Geltex Pharmaceuticals, Inc.	45
Middlesex	Waltham	Immulogic Pharmaceutical Corporation	45, 41
Middlesex	Waltham	Panametrics, Inc.	74
Middlesex	Waltham	Smithkline Beecham Clinical Lab	27
Middlesex	Waltham	T M A Thermo Analytical	37, 38, 39, 40
Middlesex	Waltham	Waltham/Weston Hospital	20
Middlesex	Watertown	Vicam	41
Middlesex	Wellesley	Interspect Corporation	Data not provided
Middlesex	Wellesley	Wellesley College	74, 45
Middlesex	Wilmington	New England Pathology Services	19
Middlesex	Winchester	Winchester Hospital	20
Middlesex	Woburn	Alphagene, Inc.	Data not provided
Middlesex	Woburn	Biomolecular Assays, Inc.	45
Middlesex	Woburn	Herley–MDI	74 – Military Radar Components
Middlesex	Woburn	Medi–Physics, Inc.	20, 21, 25, 24
Middlesex	Woburn	Repromedix Corp.	19, 27, 31
Middlesex	Woburn	Syncor International Corporation	25
Middlesex	Woburn	TM Technologies, Inc.	45, 31
Norfolk	Canton	Organogenesis, Inc.	45
Norfolk	Dedham	American Red Cross Blood Services	31
Norfolk	Holbrook	Imaging Associates, Inc.	20
Norfolk	Medfield	Ciba Corning Diagnostics, Inc.	14
Norfolk	Milton	Milton Hospital	20, 21
Norfolk	Needham	Deaconess–Glover Hospital	20, 27
Norfolk	Needham	T Cell Sciences, Inc.	31, 30, 27

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996 (Continued)

County[1]	City	Organization	Radioactive Material Use Code (Decriptions of codes are at the end of this table)
Norfolk	Norfolk	Southwood Community Hospital	20, 21
Norfolk	Norwood	Middlesex Sciences, Inc.	41, 45
Norfolk	Norwood	Norwood Hospital	20
Norfolk	Quincy	Quincy Hospital	20, 21
Norfolk	Randolph	Ares Advanced Technology, Inc.	45
Norfolk	South Weymouth	South Shore Hospital	20
Norfolk	Stoughton	Biomedical Technologies, Inc.	43, 45
Norfolk	Westwood	Behring Diagnostics, Inc.	45
Plymouth	Bridgewater	Bridgewater State College	41
Plymouth	Brockton	Brockton Hospital	20
Plymouth	Brockton	Good Samaritan Medical Center	20
Plymouth	Plymouth	Bartlett Nuclear, Inc.	75, 76
Plymouth	Plymouth	Boston Edison Company	75
Plymouth	Plymouth	Jordon Hospital	20, 21
Plymouth	Wareham	Springborn Laboratories, Inc.	40, 30, 33, 70, 41
Plymouth	Wareham	Tobey Hospital	20, 25
Suffolk	Boston	Angell Memorial Animal Hospital	20, 21
Suffolk	Boston	Beth Israel Hospital	45, 31, 19, 21
Suffolk	Boston	Boston Biomedical Research Institute	45
Suffolk	Boston	Boston University	74, 45, 42
Suffolk	Boston	Boston University Medical Center	20, 21, 74 – Teaching
Suffolk	Boston	Brigham & Women's Hospital	20
Suffolk	Boston	Bunker Hill Community College	20, 27, 21
Suffolk	Boston	Center For Blood Research	45, 42
Suffolk	Boston	Children's Hospital	45, 42, 20, 23, 31
Suffolk	Boston	Dana–Farber Cancer Institute	31, 20, 24, 21, 25
Suffolk	Boston	Du Pont Medical Products	74 – Manufacture of Radiopharmaceuticals
Suffolk	Boston	Faulkner Hospital	20
Suffolk	Boston	Forsyth Dental Center	45
Suffolk	Boston	Joslin Diabetes Center	45, 31, 66, 30
Suffolk	Boston	Massachusetts College Of Pharmacy	43, 31
Suffolk	Boston	Massachusetts Eye & Ear Infirmary	45, 42
Suffolk	Boston	Massachusetts General Hospital	20, 31
Suffolk	Boston	New England Baptist Hospital	20
Suffolk	Boston	New England Deaconess Hospital	19, 20, 23, 31
Suffolk	Boston	New England Medical Center	31, 19, 20, 21, 25
Suffolk	Boston	Nissin Molecular Biology Inst., Inc.	42, 27, 45
Suffolk	Boston	Northeastern University	45

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996 (Continued)

County[1]	City	Organization	Radioactive Material Use Code (Decriptions of codes are at the end of this table)
Suffolk	Boston	Schepens Eye Research Institute	31
Suffolk	Boston	Simmons College	45, 42
Suffolk	Boston	St. Elizabeth's Hospital	20, 21
Suffolk	Boston	Tufts University School Of Medicine	31
Suffolk	Boston	University Of Massachusetts–Boston	41, 42, 45, 43
Suffolk	Boston	U.S.D.A. Human Nutrition Research Cent	31, 29
Suffolk	Boston	V A Medical Center, Boston	20, 45, 21, 25
Suffolk	Charlestown	Biotransplant, Inc.	45
Suffolk	Charlestown	Diacrin, Inc.	45
Suffolk	Charlestown	Ergo Sciences, Inc.	27, 31
Worcester	Bolton	Yankee Atomic Electric Company	74 – Decommissioning of a Power Reactor
Worcester	Clinton	L F E Industrial Systems Corp.	5
Worcester	Fitchburg	Central New England Health Alliance	20, 21
Worcester	Gardner	Heywood Hospital	20
Worcester	Milford	Biomeasure, Inc.	45
Worcester	Milford	Milford–Whitinsville Reg. Hospital	25
Worcester	Shrewsbury	Biohybrid Technologies	45
Worcester	Shrewsbury	Sequegen	31
Worcester	Shrewsbury	Worcester Found. For Biomedical Res.	31
Worcester	Southbridge	Harrington Memorial Hospital	20
Worcester	Worcester	Alpha–Beta Technology, Inc.	45
Worcester	Worcester	Athena Diagnostics, Inc.	20
Worcester	Worcester	B A S F Bioresearch Corp.	45
Worcester	Worcester	Cambridge Biotech Corp.	45
Worcester	Worcester	Clark University	42
Worcester	Worcester	College Of The Holy Cross	45
Worcester	Worcester	Hybridon	45
Worcester	Worcester	Massachusetts Biotechnology	45
Worcester	Worcester	Medical Center Of Central Mass (Hahn.)	20, 21
Worcester	Worcester	Medical Center Of Central Mass (Mem.)	20
Worcester	Worcester	Phytera	45
Worcester	Worcester	St. Vincent Hospital	19, 20, 21, 23, 24, 25, 26
Worcester	Worcester	T S I Mason Laboratories	45, 31
Worcester	Worcester	University Of Mass. – Medical Center	45, 20, 31, 23, 19
Worcester	Worcester	Worcester Polytechnic Institute	42

[1] For organizations that produce waste at several locations, city of primary business address is listed. Organizations with multiple listings are separate units of the same company.

Table B–3
Inventory of Organizations that Reported LLRW Production or Storage During 1996 (Continued)

Radioactive Material Use Codes

Industrial

Tracers:

04 Wear\Corrosion

Instruments\Gauges:

05 Thickness

06 Density

07 Height\Level

08 Other

Radiography:

09 Gamma

Manufacturing:

14 Immobilation of Bio. Materials

Other:

15 Static Elimination

17 Smoke Detector

Medicine, Health, and Therapy

Nuclear Medicine:

19 Clinical Chemistry

20 Imaging

21 Therapeutic

Therapy:

22 Teletherapy

23 Brachytherapy

Other:

24 Bone Scanning

25 Radiopharmaceuticals

26 Heart Disease

27 Invitro–Diagnosis

29 Nutrition

30 Drug Testing

31 Biomedical Research

Agriculture:

33 Agri–Chemicals

35 Animal Husbandry

Environmental Protection:

36 Air Pollution\Global Warming

37 Water Pollution

38 Soil Contamination

39 Solid Waste

40 Environmental Fate

Research and Development:

41 Analysis of Chemical Compounds

42 Genetics

43 Isotope Dilution Analysis

44 Activation Analysis

45 Biomedical Research

47 Paleontology

Geoscience:

50 Tracing of Geological Phenomenon

53 Neutron Radiometry

Food Preservation\Pathogen Elimination:

60 Insect Disinfection

Chemistry:

66 Changes in Chemical Structure

67 Microanalysis

70 Adsorption

Other:

71 Metallurgy

74 Other

75 Power Reactor

Table B–4
1996 LLRW Producer Volume and Activity Management Summary

Organization	Produced		On–Site [1] Volume Eliminated	Storage for Decay [2]		Storage for Disposal [2]		Off–Site Volume Eliminated	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
A L G Company	9.5	0.000	0.0	9.5	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Addison Gilbert Hospital	35.0	1.250	0.0	35.0	1.250	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Advanced Magnetics	185.8	0.016	0.0	82.5	0.013	7.5	0.001	0.0	95.8	0.003	0.0	0.0
Alkermes Incorporated	490.8	0.041	22.5	41.0	0.000	419.8	0.033	0.0	0.0	0.000	7.5	0.0
Alpha–Beta Technology, Inc.	37.6	0.009	0.0	15.1	0.008	0.0	0.000	0.0	15.0	0.000	7.5	0.0
Alphagene, Inc.	1.5	0.002	0.0	1.5	0.002	0.0	0.000	0.0	0.0	0.000	0.0	0.0
American Annuity Group	3,441.6	0.038	0.0	0.0	0.000	0.0	0.000	0.0	41.6	0.008	3,400.0	0.0
American Red Cross Blood Services	1.0	0.005	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	1.0	0.0
Amersham Corporation	922.3	13,134.918	495.0	0.0	0.000	0.0	0.000	0.0	142.5	0.424	261.6	12,554.4
Amherst College	22.5	0.007	0.0	22.5	0.007	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Amicon, Inc.	2.0	0.000	0.0	2.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Angell Memorial Animal Hospital	400.0	1.773	0.0	400.0	1.773	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Anna Jaques Hospital	10.0	2.210	0.0	10.0	2.210	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Ares Advanced Technology, Inc.	46.5	62.240	0.0	46.5	62.240	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Ariad Pharmaceuticals, Inc.	61.1	0.315	0.0	27.0	0.037	0.0	0.000	0.0	0.0	0.000	24.5	0.0
Assoc. Radiologists Of Boston, Inc.	1.6	0.006	0.0	1.6	0.006	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Athena Diagnostics, Inc.	22.5	0.000	0.0	0.0	0.000	7.5	0.000	0.0	0.0	0.000	15.0	0.0
Atlanticare Medical Center	7.5	109.531	0.0	7.5	109.531	0.0	0.000	0.0	0.0	0.000	0.0	0.0
B A S F Bioresearch Corp.	442.5	0.093	367.5	30.0	0.091	0.0	0.000	19.5	3.0	0.001	15.0	0.0
Bartlett Nuclear, Inc.	3,000.0	0.070	2,925.0	0.0	0.000	0.0	0.000	0.0	75.0	0.070	0.0	0.0
Baystate Medical Center	50.0	0.002	0.0	50.0	0.002	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Behring Diagnostics, Inc.	13.9	0.000	0.0	8.2	0.000	0.0	0.000	0.0	0.0	0.000	5.7	0.0
Berkshire Medical Center	50.0	7.623	0.0	50.0	7.623	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Beth Israel Hospital	1,845.8	1.161	0.0	1,723.6	1.098	44.1	0.009	64.3	5.1	0.048	6.7	0.0
Beverly Hospital	61.0	1.790	0.0	61.0	1.790	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Biodevelopment Laboratories, Inc.	45.0	0.111	0.0	0.0	0.000	0.0	0.000	29.3	8.3	0.100	0.0	0.0
Biogen, Inc.	405.0	0.192	202.5	90.0	0.024	45.0	0.008	50.7	16.9	0.160	0.0	0.0

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1] Volume	Storage for Decay [2]		Storage for Disposal [2]		Off–Site Volume	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	Eliminated (cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	Eliminated (cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
Biohybrid Technologies	150.0	0.001	0.0	150.0	0.001	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Biomeasure, Inc.	26.1	0.073	0.0	6.0	0.015	0.0	0.000	0.0	4.1	0.057	1.0	0.0
Biomedical Technologies, Inc.	15.5	0.105	0.0	15.5	0.105	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Biomolecular Assays, Inc.	3.2	0.004	0.0	3.2	0.004	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Biotransplant, Inc.	23.9	0.036	8.9	4.1	0.028	2.0	0.000	0.0	0.0	0.000	8.2	0.0
Boston Biomedical Research Inst.	22.2	0.170	0.0	7.9	0.169	9.5	0.001	0.0	4.8	0.000	0.0	0.0
Boston College	80.0	0.086	0.0	37.5	0.076	0.0	0.000	0.0	0.0	0.000	42.5	0.0
Boston Edison Company	18,612.6	1,203.507	0.0	0.0	0.000	432.0	567.000	12,199.0	1,516.7	636.507	4,464.9	0.0
Boston Heart Foundation	10.0	0.045	0.0	10.0	0.045	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Boston Regional Medical Center	7.5	49.265	0.0	7.5	49.265	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Boston University	163.5	0.016	0.0	75.0	0.011	26.6	0.004	0.0	0.0	0.000	60.0	0.0
Boston University Medical Center	978.9	0.265	0.0	728.8	0.216	4.1	0.000	0.0	86.6	0.000	0.0	0.0
Brandeis University	832.5	0.885	585.0	187.5	0.728	52.5	0.022	0.0	7.5	0.135	0.0	0.0
Bridgewater State College	2.0	0.000	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Brigham & Women'S Hospital	1,059.2	75.221	0.0	947.2	75.213	112.0	0.008	0.0	0.0	0.000	0.0	0.0
Brockton Hospital	100.0	146.805	0.0	100.0	146.805	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Bunker Hill Community College	1.0	0.040	0.0	1.0	0.040	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Cambridge Biotech Corp.	49.4	3.568	0.0	15.0	3.510	0.0	0.000	0.0	31.4	0.058	3.0	0.0
Cambridge Neuroscience Research	135.7	0.033	0.0	34.1	0.021	52.5	0.002	0.0	45.0	0.006	0.0	0.0
Cameo Diagnostic Center, Inc.	10.0	0.155	0.0	10.0	0.155	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Cape Cod Hospital	20.0	0.388	0.0	20.0	0.388	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Cellcor, Inc.	23.2	0.000	0.0	0.0	0.000	0.7	0.000	0.0	22.5	0.000	0.0	0.0
Center For Blood Research	141.2	0.473	0.0	90.4	0.222	22.5	0.006	0.0	0.0	0.000	3.8	0.0
Central New England Health Alliance	40.0	76.683	0.0	40.0	76.683	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Charlton Memorial Hospital	100.0	246.460	0.0	100.0	246.460	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Charm Sciences, Inc.	38.0	0.008	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	37.5	0.0
Chemgenics Pharmaceuticals, Inc.	9.1	0.002	0.0	5.0	0.001	0.0	0.000	0.0	4.1	0.001	0.0	0.0
Children's Hospital	1,125.0	0.275	0.0	960.0	0.236	75.0	0.016	62.7	0.3	0.014	27.0	0.0
CIBA Corning Diagnostics, Inc.	699.1	4.039	0.0	699.1	4.039	0.0	0.000	0.0	0.0	0.000	0.0	0.0
CIS–US, Inc.	96.5	11.881	20.1	26.2	11.645	0.0	0.000	2.9	26.4	0.172	20.9	0.1

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1] Volume Eliminated	Storage for Decay [2]		Storage for Disposal [2]		Off–Site Volume Eliminated	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
Clark University	30.0	0.005	0.0	30.0	0.005	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Collaborative Biomed. Products, Inc.	45.0	0.001	22.5	0.0	0.000	0.0	0.000	0.0	0.0	0.000	7.5	0.0
College Of The Holy Cross	20.0	0.003	0.0	20.0	0.003	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Communication & Power Industries	30.0	5.323	0.0	0.0	0.000	0.0	0.000	0.0	30.0	5.323	0.0	0.0
Cooley Dickinson Hospital	160.0	5.424	0.0	160.0	5.424	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Creative Biomolecules, Inc.	106.0	0.064	0.0	91.0	0.052	0.0	0.000	0.0	0.0	0.000	15.0	0.0
Cubist Pharmaceuticals, Inc.	397.5	0.068	0.0	0.0	0.000	97.5	0.016	0.0	300.0	0.052	0.0	0.0
Cytomed, Inc.	30.0	0.010	0.0	15.0	0.009	15.0	0.000	0.0	0.0	0.000	0.0	0.0
Dana–Farber Cancer Institute	1,968.5	7.211	0.0	1,657.0	7.100	109.8	0.027	199.7	2.0	0.084	0.0	0.0
Deaconess–Glover Hospital	2.5	29.258	0.0	2.5	29.258	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Deaconess–Nashoba Hospital	16.0	81.643	0.0	16.0	81.643	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Diacrin, Inc.	58.6	0.040	22.5	24.5	0.036	0.0	0.000	0.0	7.5	0.004	0.0	0.0
Du Pont Medical Products	13,973.3	22,687.441	2,908.0	1,327.5	594.400	885.0	0.997	1,348.3	1,446.5	13,958.699	980.7	538.3
Du Pont Merck Pharmaceutical Co.	13,643.5	35.072	765.0	7,440.0	23.481	0.0	0.000	1,189.8	1,541.5	1.718	2,307.3	7.0
Dyax Corp.	2.1	0.006	0.0	2.1	0.006	0.0	0.000	0.0	0.0	0.000	0.0	0.0
E G & G	135.0	0.441	0.0	0.0	0.000	0.0	0.000	111.0	24.0	0.441	0.0	0.0
Eisai Research Institute	80.0	0.029	0.0	23.0	0.024	45.0	0.001	6.0	1.0	0.001	5.0	0.0
Emerson Hospital	10.0	1.120	0.0	10.0	1.120	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Ergo Sciences, Inc.	71.3	0.008	0.0	26.3	0.006	0.0	0.000	0.0	15.0	0.002	0.0	0.0
Eurotherm Gauging Systems, Inc.	1.0	0.002	0.0	1.0	0.002	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Exelixis Pharmaceuticals, Inc.	5.0	0.000	0.0	3.0	0.000	0.0	0.000	0.0	0.0	0.000	2.0	0.0
E.I. Du Pont De Nemours & Co.	1,380.5	88.237	845.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
E.I. Du Pont De Nemours & Co.	1,799.0	60.144	413.0	532.5	50.657	0.0	0.000	474.6	37.5	0.410	230.3	6.3
Fairview Hospital	0.7	0.112	0.0	0.7	0.112	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Falmouth Cardiology Assoc., P.C.	10.0	0.150	0.0	10.0	0.150	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Falmouth Hospital	10.0	0.650	0.0	10.0	0.650	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Faulkner Hospital	2.0	0.460	0.0	2.0	0.460	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Focal, Inc.	16.2	0.040	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	8.7	0.0
Forsyth Dental Center	49.0	0.024	0.0	25.5	0.012	0.0	0.000	22.7	0.8	0.013	0.0	0.0
Fuji Immunopharmaceuticals Corp.	25.6	0.021	0.0	13.5	0.016	0.0	0.000	0.0	0.0	0.000	9.1	0.0

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1]	Storage for Decay [2]		Storage for Disposal [2]		Off–Site	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	Volume Eliminated (cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	Volume Eliminated (cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
Fairview Hospital	0.7	0.112	0.0	0.7	0.112	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Falmouth Cardiology Assoc., P.C.	10.0	0.150	0.0	10.0	0.150	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Falmouth Hospital	10.0	0.650	0.0	10.0	0.650	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Faulkner Hospital	2.0	0.460	0.0	2.0	0.460	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Focal, Inc.	16.2	0.040	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	8.7	0.0
Forsyth Dental Center	49.0	0.024	0.0	25.5	0.012	0.0	0.000	22.7	0.8	0.013	0.0	0.0
Fuji Immunopharmaceuticals Corp.	25.6	0.021	0.0	13.5	0.016	0.0	0.000	0.0	0.0	0.000	9.1	0.0
Geltex Pharmaceuticals, Inc.	0.5	0.001	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	0.5	0.0
Genetics Institute	2,352.5	0.521	1,680.0	98.3	0.000	0.0	0.000	425.1	6.6	0.417	142.5	0.1
Genzyme Corp.	225.0	0.038	0.0	112.5	0.038	0.0	0.000	68.1	21.9	0.000	7.5	0.0
Good Samaritan Medical Center	30.0	11.723	0.0	30.0	11.723	0.0	0.000	0.0	0.0	0.000	0.0	0.0
H N U Systems, Inc.	1.0	0.820	0.0	1.0	0.820	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Hale Hospital	10.0	1.510	0.0	10.0	1.510	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Harrington Memorial Hospital	1.0	0.020	0.0	1.0	0.020	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Harvard University	4,537.6	4.522	0.0	2,908.2	3.933	1,216.9	0.132	385.7	26.8	0.457	0.0	0.0
Heart Center	10.0	0.053	0.0	10.0	0.053	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Herley–MDI	12.2	1.210	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	10.2	1.2
Heywood Hospital	75.0	48.020	0.0	75.0	48.020	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Hillcrest Hospital	10.0	59.960	0.0	10.0	59.960	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Holyoke Hospital	40.0	0.000	0.0	40.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Hyannis Heart Associates, Inc.	25.0	0.020	0.0	25.0	0.020	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Hybridon	15.0	0.107	0.0	0.0	0.000	0.0	0.000	0.0	15.0	0.107	0.0	0.0
Imaging Associates, Inc.	2.0	0.001	0.0	2.0	0.001	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Immulogic Pharmaceutical Corp.	87.3	0.019	0.0	15.0	0.000	0.0	0.000	8.1	48.5	0.019	15.7	0.0
Immunogen, Inc.	8.2	0.024	0.0	8.2	0.024	0.0	0.000	0.0	0.0	0.000	0.0	0.0
INS Corporation	1,722.8	1.422	0.0	0.0	0.000	0.0	0.000	1,232.8	96.3	0.711	393.7	0.7
Interspect Corporation	2.7	0.100	0.0	2.7	0.100	0.0	0.000	0.0	0.0	0.000	0.0	0.0

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1] Volume Eliminated	Storage for Decay [2]		Storage for Disposal [2]		Off–Site Volume Eliminated	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
Marlborough Hospital	7.5	5.801	0.0	7.5	5.801	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Massachusetts Biotechnology	28.0	0.016	0.0	15.0	0.007	0.0	0.000	0.0	0.0	0.000	13.0	0.0
Massachusetts College Of Pharmacy	1.0	0.002	0.0	1.0	0.002	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Massachusetts Eye & Ear Infirmary	165.4	0.024	0.0	150.0	0.022	7.9	0.000	7.1	0.5	0.002	0.0	0.0
Massachusetts General Hospital	6,499.7	1.816	0.0	5,516.6	1.738	58.9	0.024	279.7	3.8	0.037	24.2	0.0
Massachusetts Inst. of Technology	2,129.0	1.427	1,170.0	433.5	1.259	233.0	0.056	152.4	132.6	0.109	7.5	0.0
Matritech, Inc.	42.0	0.057	0.0	42.0	0.057	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Medical Ctr. of Central Mass. (Hahn.)	51.0	9.800	0.0	9.0	1.200	0.0	0.000	0.0	0.0	0.000	42.0	8.6
Medical Ctr. of Central Mass. (Mem.)	25.0	1.900	0.0	25.0	1.900	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Medi–Physics, Inc.	162.0	158.409	0.0	162.0	158.409	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Melrose/Wakefield Hospital	25.0	0.063	0.0	25.0	0.063	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mercy Hospital	65.0	0.304	0.0	65.0	0.304	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Metabolix, Inc.	2.0	0.007	0.0	2.0	0.007	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Metasyn, Inc.	12.0	0.000	0.0	0.0	0.000	0.0	0.000	10.3	1.7	0.000	0.0	0.0
Metrowest Medical Center	17.0	0.015	0.0	17.0	0.015	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Middlesex Sciences, Inc.	38.3	0.007	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	38.3	0.0
Milford–Whitinsville Reg. Hospital	7.5	58.231	0.0	7.5	58.231	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Millennium, Inc.	90.0	0.128	0.0	67.5	0.128	22.5	0.000	0.0	0.0	0.000	0.0	0.0
Millipore Corporation	36.0	0.013	0.0	36.0	0.013	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Milton Hospital	18.5	58.880	0.0	18.5	58.880	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mitotix, Inc.	327.0	0.263	0.0	30.7	0.146	37.5	0.014	222.0	3.0	0.086	33.8	0.0
Morton Hospital & Medical Center	110.0	0.361	0.0	110.0	0.361	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mount Holyoke Hospital	105.0	0.167	0.0	105.0	0.167	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mt. Auburn Hospital	20.4	0.418	0.0	20.4	0.418	0.0	0.000	0.0	0.0	0.000	0.0	0.0
New England Baptist Hospital	10.0	1.200	0.0	10.0	1.200	0.0	0.000	0.0	0.0	0.000	0.0	0.0
New England Biolabs, Inc.	75.0	0.109	0.0	75.0	0.109	0.0	0.000	0.0	0.0	0.000	0.0	0.0
New England Deaconess Hospital	241.6	1.480	0.0	150.0	0.032	22.5	0.004	28.1	10.7	0.577	30.2	0.9
New England Medical Center	1,024.9	0.685	75.0	799.9	0.613	67.5	0.009	50.1	2.4	0.055	30.0	0.0
New England Pathology Services	217.0	0.054	0.0	217.0	0.054	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Newton–Wellesley Hospital	15.0	102.861	0.0	15.0	102.861	0.0	0.000	0.0	0.0	0.000	0.0	0.0

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1] Volume Eliminated	Storage for Decay [2]		Storage for Disposal [2]		Off–Site Volume Eliminated	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
Millennium, Inc.	90.0	0.128	0.0	67.5	0.128	22.5	0.000	0.0	0.0	0.000	0.0	0.0
Millipore Corporation	36.0	0.013	0.0	36.0	0.013	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Milton Hospital	18.5	58.880	0.0	18.5	58.880	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mitotix, Inc.	327.0	0.263	0.0	30.7	0.146	37.5	0.014	222.0	3.0	0.086	33.8	0.0
Morton Hospital & Medical Center	110.0	0.361	0.0	110.0	0.361	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mount Holyoke College	105.0	0.167	0.0	105.0	0.167	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Mt. Auburn Hospital	20.4	0.418	0.0	20.4	0.418	0.0	0.000	0.0	0.0	0.000	0.0	0.0
New England Baptist Hospital	10.0	1.200	0.0	10.0	1.200	0.0	0.000	0.0	0.0	0.000	0.0	0.0
New England Biolabs, Inc.	75.0	0.109	0.0	75.0	0.109	0.0	0.000	0.0	0.0	0.000	0.0	0.0
New England Deaconess Hospital	241.6	1.480	0.0	150.0	0.032	22.5	0.004	28.1	10.7	0.577	30.2	0.9
New England Medical Center	1,024.9	0.685	75.0	799.9	0.613	67.5	0.009	50.1	2.4	0.055	30.0	0.0
New England Pathology Services	217.0	0.054	0.0	217.0	0.054	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Newton–Wellesley Hospital	15.0	102.861	0.0	15.0	102.861	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Nissin Molecular Biology Inst., Inc.	2.0	0.002	0.0	2.0	0.002	0.0	0.000	0.0	0.0	0.000	0.0	0.0
NMC Diagnostic Services, Inc.	7.5	2.656	0.0	7.5	2.656	0.0	0.000	0.0	0.0	0.000	0.0	0.0
North Adams Regional Hospital	0.0	0.902	0.0	0.0	0.902	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Northeastern University	207.3	0.022	80.2	75.0	0.014	24.1	0.005	5.6	10.4	0.003	12.0	0.0
Norwood Hospital	28.0	33.211	0.0	28.0	33.211	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Nuclear Metals, Inc.	8,971.8	3.357	2,030.6	0.0	0.000	0.0	0.000	0.0	5,966.2	2.678	975.0	0.7
Omnigene Bioproducts, Inc.	2.5	0.002	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	2.5	0.0
Omnigene Diagnostics, Inc.	4.0	0.000	0.0	4.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Oncogene Science, Inc.	14.3	0.007	0.0	12.3	0.006	0.0	0.000	0.0	0.0	0.000	2.0	0.0
Ontogeny, Inc.	23.5	0.003	12.3	7.1	0.002	0.0	0.000	3.2	0.9	0.001	0.0	0.0
Organogenesis, Inc.	57.5	0.016	0.0	20.0	0.011	0.0	0.000	0.0	30.0	0.004	7.5	0.0
Our Lady Of The Elms College	8.0	0.000	0.0	8.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Oxford Analytical, Inc.	1.0	1.073	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	1.0	1.1
Panametrics, Inc.	1.0	0.000	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1] Volume Eliminated	Storage for Decay [2]		Storage for Disposal [2]		Off–Site Volume Eliminated	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	(cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
Seragen, Inc.	165.0	0.035	0.0	0.0	0.000	82.5	0.018	80.7	1.8	0.017	0.0	0.0
Shared Diagnostics Services	7.5	1.970	0.0	7.5	1.970	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Simmons College	14.8	0.004	0.0	3.0	0.002	0.0	0.000	0.0	0.0	0.000	10.2	0.0
Smith College	24.4	0.034	0.0	15.2	0.032	0.0	0.000	3.8	3.0	0.002	2.4	0.0
Smithkline Beecham Clinical Lab	7.5	0.006	0.0	7.5	0.006	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Somerville Hospital	7.5	23.657	0.0	7.5	23.657	0.0	0.000	0.0	0.0	0.000	0.0	0.0
South Shore Hospital	50.0	20.823	0.0	50.0	20.823	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Southwood Community Hospital	27.0	14.570	0.0	27.0	14.570	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Springborn Laboratories, Inc.	300.0	0.002	90.0	0.0	0.000	165.0	0.001	0.0	45.0	0.001	0.0	0.0
Sturdy Memorial Hospital	7.5	63.989	0.0	7.5	63.989	0.0	0.000	0.0	0.0	0.000	0.0	0.0
St. Elizabeth's Hospital	7.5	0.000	0.0	7.5	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
St. Luke's Hospital	10.0	0.078	0.0	10.0	0.078	0.0	0.000	0.0	0.0	0.000	0.0	0.0
St. Vincent Hospital	147.0	46.904	0.0	147.0	46.904	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Syncor International Corporation	582.0	40.106	0.0	582.0	40.106	0.0	0.000	0.0	0.0	0.000	0.0	0.0
T Cell Sciences, Inc.	39.8	0.017	0.0	16.0	0.014	0.0	0.000	13.4	3.0	0.003	7.4	0.0
T M A Thermo Analytical	40.3	0.003	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	40.3	0.0
T S I Mason Laboratories	133.5	0.003	0.0	18.0	0.001	53.0	0.001	39.0	16.0	0.001	7.5	0.0
Texas Instruments	226,258.7	0.766	0.0	0.0	0.000	0.0	0.000	0.0	226,258.7	0.766	0.0	0.0
TM Technologies, Inc.	23.5	0.010	0.0	23.5	0.010	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Tobey Hospital	12.0	0.205	0.0	12.0	0.205	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Transkaryotic Therapies, Inc.	165.0	0.051	0.0	30.0	0.030	0.0	0.000	106.3	28.7	0.021	0.0	0.0
Tufts University	67.5	0.031	0.0	30.0	0.014	0.0	0.000	0.0	0.0	0.000	15.0	0.0
Tufts University School Of Medicine	1,105.9	42.458	75.0	820.9	42.380	135.0	0.018	49.8	2.7	0.053	22.5	0.0
T.R. Wilbury Laboratories, Inc.	10.3	0.016	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	10.0	0.0
University Of Massachusetts	465.0	0.162	90.0	307.5	0.137	0.0	0.000	0.0	0.0	0.000	45.0	0.0
Univer. of Massachusetts – Boston	23.8	0.003	12.0	4.0	0.001	0.0	0.000	0.0	0.0	0.000	3.8	0.0
Univer. of Massachusetts – Lowell	6.0	0.030	0.0	3.0	0.020	0.0	0.000	0.0	0.0	0.000	3.0	0.0
Univer. of Mass. – Medical Center	2,911.0	110.051	0.0	2,020.0	89.746	410.0	0.000	86.8	55.7	0.303	1.0	20.0
U.S. Army SSCOM	41.4	0.094	0.0	5.7	0.017	0.0	0.000	0.0	0.0	0.000	35.8	0.1
U.S.D.A. Human Nutrition Res. Ctr.	158.2	4.044	15.0	67.5	0.034	60.0	0.008	7.1	0.4	0.001	8.2	4.0

Table B–4
1996 LLRW Producer Volume and Activity Management Summary
(Continued)

Organization	Produced		On–Site [1]	Storage for Decay [2]		Storage for Disposal [2]		Off–Site	Shipped for Disposal		Accumulated in Storage [3]	
	Volume (cuft)	Activity (curies)	Volume Eliminated (cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)	Volume Eliminated (cuft)	Volume (cuft)	Activity (curies)	Volume (cuft)	Activity (curies)
V A Medical Center, Boston	131.0	36.953	0.0	123.5	36.953	7.5	0.000	0.0	0.0	0.000	0.0	0.0
VA Hospital (ENRM)	69.2	0.015	0.0	22.1	0.001	12.3	0.004	0.0	7.5	0.005	27.3	0.0
Vertex Pharmaceuticals	166.2	0.401	45.0	77.0	0.399	0.0	0.000	0.0	15.0	0.000	0.0	0.0
Vicam	3.0	0.000	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	3.0	0.0
Virus Research Institute	5.2	0.010	0.0	5.0	0.008	0.0	0.000	0.0	0.0	0.000	0.2	0.0
Waltham/Weston Hospital	25.0	1.120	0.0	25.0	1.120	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Wellesley College	75.0	0.004	0.0	7.5	0.002	7.5	0.000	0.0	0.0	0.000	15.0	0.0
Wheaton College	5.5	0.001	0.0	0.0	0.000	0.0	0.000	0.0	0.0	0.000	5.5	0.0
Whidden Memorial Hospital	25.0	1.210	0.0	25.0	1.210	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Whitehead Inst. For Biomedical Res.	494.6	0.598	120.0	292.5	0.583	0.0	0.000	17.9	12.1	0.012	52.1	0.0
Williams College	27.0	0.012	0.0	20.0	0.009	0.0	0.000	0.0	0.0	0.000	3.0	0.0
Winchester Hospital	8.0	130.531	0.0	8.0	130.531	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Wing Memorial Hospital	55.0	0.220	0.0	55.0	0.220	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Woods Hole Oceanographic Inst.	70.5	0.004	0.0	22.5	0.003	37.5	0.000	0.0	7.5	0.000	3.0	0.0
Worcester Found. for Biomed. Res.	1,656.5	0.581	1,125.0	404.0	0.324	15.0	0.000	25.6	11.9	0.253	0.0	0.0
Worcester Polytechnic Institute	4.0	0.002	0.0	4.0	0.002	0.0	0.000	0.0	0.0	0.000	0.0	0.0
W.R. Grace & Co.	139.0	0.000	96.0	43.0	0.000	0.0	0.000	0.0	0.0	0.000	0.0	0.0
Yankee Atomic Electric Company	27,152.1	1,869.893	0.0	0.0	0.000	0.0	0.000	18,946.1	8,206.0	1,869.893	0.0	0.0
TOTAL	365,952.2	42,792.2	16,384.3	37,695.4	2,772.1	5,340.9	568.5	38,039.0	246,700.9	16,481.1	14,158.9	14,700.8

[1] Waste generated prior to 1991.

[2] On and off–site totals combined.

[3] LLRW and/or mixed LLRW stored during 1996 or retained from previous years.

Table B–5
Ranking by Volume of Organizations that Shipped LLRW for Disposal During 1996
(cubic feet)

Organization	Disposal Class			Total	% of Total	Cumulative %
	Class A/AH	Class B	Class C			
Texas Instruments	226,258.7	0.0	0.0	226,258.7	91.64	91.64
Yankee Atomic Electric Company	6,907.0	156.0	1,143.0	8,206.0	3.32	94.96
Nuclear Metals, Inc.	5,966.2	0.0	0.0	5,966.2	2.42	97.38
Du Pont Merck Pharmaceutical Co.	1,541.5	0.0	0.0	1,541.5	0.62	98.00
Boston Edison Company	1,384.3	132.4	0.0	1,516.7	0.61	98.62
Du Pont Medical Products	1,107.3	339.2	0.0	1,446.5	0.59	99.20
Cubist Pharmaceuticals, Inc.	300.0	0.0	0.0	300.0	0.12	99.32
Amersham Corporation	142.5	0.0	0.0	142.5	0.06	99.47
Massachusetts Institute Of Technology	132.6	0.0	0.0	132.6	0.05	99.53
INS Corporation	96.3	0.0	0.0	96.3	0.04	99.57
Advanced Magnetics	95.8	0.0	0.0	95.8	0.04	99.60
Boston University Medical Center	86.6	0.0	0.0	86.6	0.04	99.64
Bartlett Nuclear, Inc.	75.0	0.0	0.0	75.0	0.03	99.67
Pharmaceutical Peptides, Inc.	67.5	0.0	0.0	67.5	0.03	99.70
Univer. of Massachusetts–Medical Center	55.7	0.0	0.0	55.7	0.02	99.72
Immulogic Pharmaceutical Corp.	48.5	0.0	0.0	48.5	0.02	99.74
Cambridge Neuroscience Research	45.0	0.0	0.0	45.0	0.02	99.78
Springborn Laboratories, Inc.	45.0	0.0	0.0	45.0	0.02	99.76
American Annuity Group	41.6	0.0	0.0	41.6	0.02	99.79
E.I. Du Pont De Nemours & Co.	37.5	0.0	0.0	37.5	0.02	99.81
Cambridge Biotech Corp.	31.4	0.0	0.0	31.4	0.01	99.82
Communication & Power Industries	30.0	0.0	0.0	30.0	0.01	99.83
Organogenesis, Inc.	30.0	0.0	0.0	30.0	0.01	99.85
Transkaryotic Therapies, Inc.	28.7	0.0	0.0	28.7	0.01	99.86
Harvard University	26.8	0.0	0.0	26.8	0.01	99.87
CIS–US, Inc.	26.4	0.0	0.0	26.4	0.01	99.88
E G & G	24.0	0.0	0.0	24.0	0.01	99.89
Cellcor, Inc.	22.5	0.0	0.0	22.5	0.01	99.90
Genzyme Corp.	21.9	0.0	0.0	21.9	0.01	99.90
Proscript, Inc.	19.1	0.0	0.0	19.1	0.01	99.90
Biogen, Inc.	16.9	0.0	0.0	16.9	0.01	99.91
T S I Mason Laboratories	16.0	0.0	0.0	16.0	0.01	99.92
Alpha–Beta Technology, Inc.	15.0	0.0	0.0	15.0	0.01	99.94
Ergo Sciences, Inc.	15.0	0.0	0.0	15.0	0.01	99.93
Hybridon	15.0	0.0	0.0	15.0	0.01	99.94
Vertex Pharmaceuticals	15.0	0.0	0.0	15.0	0.01	99.92
Whitehead Inst. For Biomedical Res.	12.1	0.0	0.0	12.1	0.00	99.95
Worcester Found. For Biomedical Research	11.9	0.0	0.0	11.9	0.00	99.95
New England Deaconess Hospital	10.7	0.0	0.0	10.7	0.00	99.96
Northeastern University	10.4	0.0	0.0	10.4	0.00	99.96
Biodevelopment Laboratories, Inc.	8.3	0.0	0.0	8.3	0.00	99.96
Diacrin, Inc.	7.5	0.0	0.0	7.5	0.00	99.98
VA Hospital (ENRM)	7.5	0.0	0.0	7.5	0.00	99.97

Table B–5
Ranking by Volume of Organizations that Shipped LLRW for Disposal During 1996
(Continued)
(cubic feet)

Organization	Disposal Class			Total	% of Total	Cumulative %
	Class A/AH	Class B	Class C			
Woods Hole Oceanographic Institution	7.5	0.0	0.0	7.5	0.00	99.97
Brandeis University	7.5	0.0	0.0	7.5	0.00	99.97
Genetics Institute	6.6	0.0	0.0	6.6	0.00	99.98
Beth Israel Hospital	5.1	0.0	0.0	5.1	0.00	99.98
Boston Biomedical Research Inst.	4.8	0.0	0.0	4.8	0.00	99.98
Biomeasure, Inc.	4.1	0.0	0.0	4.1	0.00	99.98
Chemgenics Pharmaceuticals, Inc.	4.1	0.0	0.0	4.1	0.00	99.99
Massachusetts General Hospital	3.8	0.0	0.0	3.8	0.00	99.99
Marine Biological Laboratory	3.8	0.0	0.0	3.8	0.00	99.99
Smith College	3.0	0.0	0.0	3.0	0.00	99.99
B A S F Bioresearch Corp.	3.0	0.0	0.0	3.0	0.00	99.99
Mitotix, Inc.	3.0	0.0	0.0	3.0	0.00	99.99
T Cell Sciences, Inc.	3.0	0.0	0.0	3.0	0.00	99.99
Tufts University School Of Medicine	2.7	0.0	0.0	2.7	0.00	100.00
New England Medical Center	2.4	0.0	0.0	2.4	0.00	100.00
Dana–Farber Cancer Institute	2.0	0.0	0.0	2.0	0.00	100.00
Seragen, Inc.	1.8	0.0	0.0	1.8	0.00	100.00
Metasyn, Inc.	1.7	0.0	0.0	1.7	0.00	100.00
Eisai Research Institute	1.0	0.0	0.0	1.0	0.00	100.00
Ontogeny, Inc.	0.9	0.0	0.0	0.9	0.00	100.00
Forsyth Dental Center	0.8	0.0	0.0	0.8	0.00	100.00
Massachusetts Eye & Ear Infirmary	0.5	0.0	0.0	0.5	0.00	100.00
U.S.D.A. Human Nutrition Research Center	0.4	0.0	0.0	0.4	0.00	100.00
Children's Hospital	0.3	0.0	0.0	0.3	0.00	100.00
TOTAL	244,930.3	627.6	1,143.0	246,700.9	100.0	

Table B–6
Ranking by Activity of Organizations that Shipped LLRW for Disposal During 1996 (curies)

Organization	Disposal Class			Total	% of Total	Cumulative %
	Class A/AH	Class B	Class C			
Du Pont Medical Products	22.4857	13,936.2135	0.0000	13,958.6992	84.70	84.70
Yankee Atomic Electric Company	16.6276	55.0018	1,798.2639	1,869.8933	11.35	96.05
Boston Edison Company	45.8977	590.6094	0.0000	636.5071	3.86	99.91
Communication & Power Industries	5.3234	0.0000	0.0000	5.3234	0.03	99.94
Nuclear Metals, Inc.	2.6775	0.0000	0.0000	2.6775	0.02	99.96
Du Pont Merck Pharmaceutical Co.	1.7183	0.0000	0.0000	1.7183	0.01	99.97
Texas Instruments	0.7656	0.0000	0.0000	0.7656	0.00	99.97
INS Corporation	0.7108	0.0000	0.0000	0.7108	0.00	99.98
New England Deaconess Hospital	0.5772	0.0000	0.0000	0.5772	0.00	99.98
Harvard University	0.4571	0.0000	0.0000	0.4571	0.00	99.98
E G & G	0.4411	0.0000	0.0000	0.4411	0.00	99.98
Amersham Corporation	0.4240	0.0000	0.0000	0.4240	0.00	99.99
Genetics Institute	0.4166	0.0000	0.0000	0.4166	0.00	99.99
E.I. Du Pont De Nemours & Co.	0.4105	0.0000	0.0000	0.4105	0.00	99.99
University Of Massachusetts–Medical Center	0.3028	0.0000	0.0000	0.3028	0.00	99.99
Worcester Found. For Biomedical Research	0.2530	0.0000	0.0000	0.2530	0.00	100.00
CIS–US, Inc.	0.1719	0.0000	0.0000	0.1719	0.00	100.00
Biogen, Inc.	0.1598	0.0000	0.0000	0.1598	0.00	100.00
Brandeis University	0.1347	0.0000	0.0000	0.1347	0.00	100.00
Massachusetts Institute Of Technology	0.1092	0.0000	0.0000	0.1092	0.00	100.00
Hybridon	0.1067	0.0000	0.0000	0.1067	0.00	100.00
Biodevelopment Laboratories, Inc.	0.0996	0.0000	0.0000	0.0996	0.00	100.00
Mitotix, Inc.	0.0860	0.0000	0.0000	0.0860	0.00	100.00
Dana–Farber Cancer Institute	0.0839	0.0000	0.0000	0.0839	0.00	100.00
Bartlett Nuclear, Inc.	0.0696	0.0000	0.0000	0.0696	0.00	100.00
Cambridge Biotech Corp.	0.0575	0.0000	0.0000	0.0575	0.00	100.00
Biomeasure, Inc.	0.0571	0.0000	0.0000	0.0571	0.00	100.00
New England Medical Center	0.0550	0.0000	0.0000	0.0550	0.00	100.00
Tufts University School Of Medicine	0.0529	0.0000	0.0000	0.0529	0.00	100.00
Cubist Pharmaceuticals, Inc.	0.0523	0.0000	0.0000	0.0523	0.00	100.00
Beth Israel Hospital	0.0482	0.0000	0.0000	0.0482	0.00	100.00
Massachusetts General Hospital	0.0373	0.0000	0.0000	0.0373	0.00	100.00
Transkaryotic Therapies, Inc.	0.0206	0.0000	0.0000	0.0206	0.00	100.00
Proscript, Inc.	0.0189	0.0000	0.0000	0.0189	0.00	100.00
Immulogic Pharmaceutical Corp.	0.0186	0.0000	0.0000	0.0186	0.00	100.00
Seragen, Inc.	0.0168	0.0000	0.0000	0.0168	0.00	100.00
Children's Hospital	0.0143	0.0000	0.0000	0.0143	0.00	100.00
Forsyth Dental Center	0.0127	0.0000	0.0000	0.0127	0.00	100.00
Whitehead Inst. For Biomedical Res.	0.0124	0.0000	0.0000	0.0124	0.00	100.00
American Annuity Group	0.0085	0.0000	0.0000	0.0085	0.00	100.00
Cambridge Neuroscience Research	0.0060	0.0000	0.0000	0.0060	0.00	100.00
Marine Biological Laboratory	0.0054	0.0000	0.0000	0.0054	0.00	100.00
VA Hospital (ENRM)	0.0048	0.0000	0.0000	0.0048	0.00	100.00

Table B–6
Ranking by Activity of Organizations that Shipped LLRW for Disposal During 1996 (Continued)
(curies)

Organization	Disposal Class			Total	% of Total	Cumulative %
	Class A/AH	Class B	Class C			
Organogenesis, Inc.	0.0042	0.0000	0.0000	0.0042	0.00	100.00
Diacrin, Inc.	0.0038	0.0000	0.0000	0.0038	0.00	100.00
Northeastern University	0.0029	0.0000	0.0000	0.0029	0.00	100.00
T Cell Sciences, Inc.	0.0029	0.0000	0.0000	0.0029	0.00	100.00
Advanced Magnetics	0.0029	0.0000	0.0000	0.0029	0.00	100.00
Pharmaceutical Peptides, Inc.	0.0022	0.0000	0.0000	0.0022	0.00	100.00
Massachusetts Eye & Ear Infirmary	0.0019	0.0000	0.0000	0.0019	0.00	100.00
Smith College	0.0017	0.0000	0.0000	0.0017	0.00	100.00
Ergo Sciences, Inc.	0.0015	0.0000	0.0000	0.0015	0.00	100.00
Springborn Laboratories, Inc.	0.0014	0.0000	0.0000	0.0014	0.00	100.00
U.S.D.A. Human Nutrition Research Center	0.0012	0.0000	0.0000	0.0012	0.00	100.00
Ontogeny, Inc.	0.0010	0.0000	0.0000	0.0010	0.00	100.00
Eisai Research Institute	0.0009	0.0000	0.0000	0.0009	0.00	100.00
T S I Mason Laboratories	0.0008	0.0000	0.0000	0.0008	0.00	100.00
Chemgenics Pharmaceuticals, Inc.	0.0008	0.0000	0.0000	0.0008	0.00	100.00
B A S F Bioresearch Corp.	0.0006	0.0000	0.0000	0.0006	0.00	100.00
Vertex Pharmaceuticals	0.0005	0.0000	0.0000	0.0005	0.00	100.00
Boston University Medical Center	0.0004	0.0000	0.0000	0.0004	0.00	100.00
Alpha–Beta Technology, Inc.	0.0002	0.0000	0.0000	0.0002	0.00	100.00
Cellcor, Inc.	0.0001	0.0000	0.0000	0.0001	0.00	100.00
Boston Biomedical Research Inst.	0.0001	0.0000	0.0000	0.0001	0.00	100.00
Woods Hole Oceanographic Institution	0.0000	0.0000	0.0000	0.0000	0.00	100.01
Genzyme Corp.	0.0000	0.0000	0.0000	0.0000	0.00	100.01
Metasyn, Inc.	0.0000	0.0000	0.0000	0.0000	0.00	100.01
TOTAL	101.0417	14,581.8247	1,798.2639	16,481.1303	100.00	

Appendix C
1997 LLRW Characteristic Data

Tables in this appendix present waste category data for each LLRW management method described in Appendix A.

Table C–1
1996 Total LLRW Volume Reported – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	1,551.8	314.0	0.0	60.0	0.0	1,925.8	0.5
DAW–Uncomp. Bulk Materials	10,297.4	38,266.6	39.9	13,679.5	34,709.7	96,993.1	26.5
DAW–Soils/Building Rubble	0.0	230,819.2	0.0	0.0	0.0	230,819.2	63.1
DAW–Compacted Solids	0.0	53.9	0.0	0.0	0.0	53.9	0.0
DAW–Uncompacted Solids	0.0	2,328.9	0.0	10.0	2,673.0	5,011.9	1.4
DAW–Medical Wastes	104.8	1,721.2	0.0	2,922.7	0.0	4,748.7	1.3
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	1.0	0.0	0.0	4,244.1	4,245.1	1.2
Dewatered Filter Media	0.0	0.0	0.0	0.0	1,312.4	1,312.4	0.4
Other Dewatered Sludges	18.0	2,880.0	0.0	0.0	549.8	3,447.8	0.9
Solidified Ion Exchange Media	15.2	7.0	0.0	0.0	0.0	22.2	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	1.0	0.0	0.0	892.0	893.0	0.2
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	12.2	0.0	0.0	0.0	12.2	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	939.2	2,065.5	0.0	1,054.6	0.0	4,059.3	1.1
LSF/V's Inorganic	452.5	240.1	0.0	83.1	0.0	775.7	0.2
Other Organic Liquids	0.0	4,763.3	0.0	0.0	0.0	4,763.3	1.3
Incinerator Ash	0.0	0.0	0.0	86.6	0.0	86.6	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	1,220.9	750.3	0.0	105.8	0.0	2,077.0	0.6
Irradiated Rx Components	0.0	0.0	0.0	0.0	862.0	862.0	0.2
Other Irradiated Materials	7.5	0.2	0.0	0.0	0.0	7.7	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	4.2	185.5	1.5	23.1	0.7	215.0	0.1
Contaminated Oil/Lubricant	0.0	22.5	0.0	0.0	432.0	454.5	0.1
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	11.0	0.0	0.0	220.7	0.0	231.7	0.1
Aqueous Liquids	267.5	2,577.6	0.0	0.0	89.0	2,934.1	0.8
Total	14,890.0	287,010.0	41.4	18,246.0	45,764.7	365,952.1	100.0
% of Total	4.1	78.4	0.0	5.0	12.5	100.0	

Note: includes 1996 production and storage from prior years.

Table C–2
1996 Total LLRW Activity Reported – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	2.072	0.029	0.000	0.036	0.000	2.138	0.0
DAW–Uncomp. Bulk Materials	62.756	487.651	0.020	422.934	19.974	993.334	2.3
DAW–Soils/Building Rubble	0.000	0.981	0.000	0.000	0.000	0.981	0.0
DAW–Compacted Solids	0.000	66.070	0.000	0.000	0.000	66.070	0.2
DAW–Uncompacted Solids	0.000	6,891.279	0.000	0.111	4.027	6,895.417	16.1
DAW–Medical Wastes	0.436	201.989	0.000	1,171.787	0.000	1,374.212	3.2
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.840	0.000	0.000	0.000	0.840	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	159.378	159.378	0.4
Other Dewatered Sludges	0.004	3.224	0.000	0.000	591.327	594.554	1.4
Solidified Ion Exchange Media	0.032	0.010	0.000	0.000	0.000	0.042	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.004	0.000	0.000	141.021	141.024	0.3
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.027	0.000	0.000	0.000	0.027	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.157	1.431	0.000	0.239	0.000	1.826	0.0
LSF/V's Inorganic	0.010	4.806	0.000	0.017	0.000	4.833	0.0
Other Organic Liquids	0.000	7,847.957	0.000	0.000	0.000	7,847.957	18.3
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.089	0.265	0.000	0.045	0.000	0.399	0.0
Irradiated Rx Components	0.000	0.000	0.000	0.000	1,590.668	1,590.668	3.7
Other Irradiated Materials	0.000	0.012	0.000	0.000	0.000	0.012	0.0
Gases in Sealed Containers	0.000	0.090	0.000	0.000	0.000	0.090	0.0
Sealed Sources	24.001	8,056.090	0.074	1.440	0.007	8,081.612	18.9
Contaminated Oil/Lubricant	0.000	0.002	0.000	0.000	567.000	567.002	1.3
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	73.579	0.000	0.000	91.886	0.000	165.465	0.4
Aqueous Liquids	1.596	14,302.680	0.000	0.000	0.000	14,304.276	33.4
Total	164.732	37,865.437	0.094	1,688.493	3,073.400	42,792.157	100.0
% of Total	0.4	88.5	0.0	3.9	7.2	100.0	

Note: includes 1996 production and storage from prior years.

Table C–3
1996 LLRW Volume Incinerated for Disposal On Site – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	105.5	0.0	0.0	173.5	0.0	279.0	18.7
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	1,216.9	0.0	0.0	0.0	0.0	1,216.9	81.3
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,322.4	0.0	0.0	173.5	0.0	1,495.9	100.0
% of Total	88.4	0.0	0.0	11.6	0.0	100.0	

Table C–4
1996 LLRW Activity Incinerated for Disposal On Site – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.021	0.000	0.000	0.056	0.000	0.077	52.6
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.069	0.000	0.000	0.000	0.000	0.069	47.4
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Total	0.090	0.000	0.000	0.056	0.000	0.145	100.0
% of Total	61.8	0.0	0.0	38.2	0.0	100.0	

Table C–5
1996 LLRW Volume Incinerated for Disposal Off Site – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.7	0.0	0.0	0.0	0.7	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	895.7	1,383.9	0.0	378.3	0.0	2,657.9	69.1
LSF/V's Inorganic	0.0	129.5	0.0	83.1	0.0	212.6	5.5
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	464.0	0.0	17.9	0.0	481.9	12.5
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	432.0	432.0	11.2
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	60.0	0.0	0.0	0.0	60.0	1.6
Total	895.7	2,038.1	0.0	479.3	432.0	3,845.0	100.0
% of Total	23.3	53.0	0.0	12.5	11.2	100.0	

Table C–6
1996 LLRW Activity Incinerated for Disposal Off Site – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.156	1.039	0.000	0.071	0.000	1.265	0.2
LSF/V's Inorganic	0.000	0.009	0.000	0.017	0.000	0.026	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.000	0.040	0.000	0.002	0.000	0.042	0.0
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	567.000	567.000	99.8
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.018	0.000	0.000	0.000	0.018	0.0
Total	0.156	1.107	0.000	0.089	567.000	568.351	100.0
% of Total	0.0	0.2	0.0	0.0	99.8	100.0	

Table C–7
1996 LLRW Volume in On–Site Storage – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.0	37.7	0.0	0.0	0.0	37.7	0.3
DAW–Uncomp. Bulk Materials	290.0	3,420.6	34.3	98.7	0.0	3,843.5	26.3
DAW–Soils/Building Rubble	0.0	3,498.0	0.0	0.0	0.0	3,498.0	23.9
DAW–Compacted Solids	0.0	4.1	0.0	0.0	0.0	4.1	0.0
DAW–Uncompacted Solids	0.0	668.2	0.0	0.0	0.0	668.2	4.6
DAW–Medical Wastes	2.4	48.4	0.0	7.0	0.0	57.8	0.4
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	4,244.1	4,244.1	29.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	205.8	205.8	1.4
Other Dewatered Sludges	3.0	570.0	0.0	0.0	0.0	573.0	3.9
Solidified Ion Exchange Media	0.0	7.0	0.0	0.0	0.0	7.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	4.1	0.0	0.0	0.0	4.1	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	3.8	438.6	0.0	0.0	0.0	442.4	3.0
LSF/V's Inorganic	12.5	42.0	0.0	0.0	0.0	54.5	0.4
Other Organic Liquids	0.0	15.0	0.0	0.0	0.0	15.0	0.1
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	7.5	0.0	9.2	0.0	16.7	0.1
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	7.5	0.2	0.0	0.0	0.0	7.7	0.1
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	4.2	104.1	1.5	19.7	0.0	129.5	0.9
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	36.0	0.0	36.0	0.2
Aqueous Liquids	4.0	774.0	0.0	0.0	0.0	778.0	5.3
Total	327.4	9,640.5	35.8	170.6	4,449.9	14,624.1	100.0
% of Total	2.2	65.9	0.2	1.2	30.4	100.0	

Table C–8
1996 LLRW Activity in On–Site Storage – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.000	0.004	0.000	0.000	0.000	0.004	0.0
DAW–Uncomp. Bulk Materials	0.081	131.211	0.004	0.026	0.000	131.321	0.9
DAW–Soils/Building Rubble	0.000	0.031	0.000	0.000	0.000	0.031	0.0
DAW–Compacted Solids	0.000	5.000	0.000	0.000	0.000	5.000	0.0
DAW–Uncompacted Solids	0.000	6,741.545	0.000	0.000	0.000	6,741.545	44.7
DAW–Medical Wastes	0.000	0.018	0.000	1.405	0.000	1.423	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.001	0.677	0.000	0.000	0.000	0.677	0.0
Solidified Ion Exchange Media	0.000	0.010	0.000	0.000	0.000	0.010	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.004	0.000	0.000	0.000	0.004	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.003	0.000	0.000	0.000	0.003	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.320	0.000	0.000	0.000	0.321	0.0
LSF/V's Inorganic	0.001	0.006	0.000	0.000	0.000	0.007	0.0
Other Organic Liquids	0.000	4.554	0.000	0.000	0.000	4.554	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.000	0.095	0.000	0.000	0.000	0.095	0.0
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.012	0.000	0.000	0.000	0.012	0.0
Gases in Sealed Containers	0.000	0.090	0.000	0.000	0.000	0.090	0.0
Sealed Sources	24.001	8,054.700	0.074	0.868	0.000	8,079.643	53.5
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	7.200	0.000	7.200	0.0
Aqueous Liquids	0.002	117.864	0.000	0.000	0.000	117.866	0.8
Total	24.086	15,056.144	0.078	9.499	0.000	15,089.806	100.0
% of Total	0.2	99.8	0.0	0.1	0.0	100.0	

Table C–9
1996 LLRW Volume in Off–Site Storage – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	463.2	0.0	0.0	0.0	463.2	67.5
DAW–Soils/Building Rubble	0.0	143.7	0.0	0.0	0.0	143.7	20.9
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	12.2	0.0	0.0	0.0	12.2	1.8
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	0.6	0.0	0.0	0.0	0.6	0.1
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	5.0	0.0	0.0	0.0	5.0	0.7
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	61.8	0.0	0.0	0.0	61.8	9.0
Total	0.0	686.5	0.0	0.0	0.0	686.5	100.0
% of Total	0.0	100.0	0.0	0.0	0.0	100.0	

Table C–10
1996 LLRW Activity in Off–Site Storage – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	40.218	0.000	0.000	0.000	40.218	78.5
DAW–Soils/Building Rubble	0.000	0.182	0.000	0.000	0.000	0.182	0.4
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.054	0.000	0.000	0.000	0.054	0.1
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.000	0.074	0.000	0.000	0.000	0.074	0.1
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.002	0.000	0.000	0.000	0.002	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	10.730	0.000	0.000	0.000	10.730	20.9
Total	0.000	51.260	0.000	0.000	0.000	51.260	100.0
% of Total	0.0	100.0	0.0	0.0	0.0	100.0	

Table C–11
1996 Specific Waste Disposal Volume – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	7.5	0.0	133.1	0.0	140.6	10.6
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	22.5	83.5	0.0	616.5	0.0	722.4	54.4
LSF/V's Inorganic	420.0	4.1	0.0	0.0	0.0	424.1	32.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	13.6	0.0	26.2	0.0	39.8	3.0
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	442.5	108.6	0.0	775.8	0.0	1,326.9	100.0
% of Total	33.3	8.2	0.0	58.5	0.0	100.0	

Table C–12
1996 Specific Waste Disposal Activity – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.012	0.000	0.035	0.000	0.047	49.2
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.013	0.000	0.014	0.000	0.028	28.9
LSF/V's Inorganic	0.007	0.000	0.000	0.000	0.000	0.007	6.9
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.000	0.001	0.000	0.013	0.000	0.014	14.9
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Total	0.007	0.026	0.000	0.063	0.000	0.095	100.0
% of Total	7.1	27.1	0.0	65.8	0.0	100.0	

Table C–13
1996 LLRW Volume Stored for Decay On Site – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	240.0	176.5	0.0	60.0	0.0	476.5	1.4
DAW–Uncomp. Bulk Materials	7,032.7	11,110.2	5.7	10,312.5	0.0	28,461.1	81.2
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	45.0	0.0	0.0	0.0	45.0	0.1
DAW–Uncompacted Solids	0.0	9.5	0.0	10.0	0.0	19.5	0.1
DAW–Medical Wastes	102.4	1,657.0	0.0	2,915.7	0.0	4,675.0	13.3
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	15.0	0.0	0.0	0.0	0.0	15.0	0.0
Solidified Ion Exchange Media	15.2	0.0	0.0	0.0	0.0	15.2	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	7.4	0.0	0.0	0.0	7.4	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	0.0	16.5	0.0	40.0	0.0	56.5	0.2
LSF/V's Inorganic	20.0	15.0	0.0	0.0	0.0	35.0	0.1
Other Organic Liquids	0.0	72.8	0.0	0.0	0.0	72.8	0.2
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	4.0	82.3	0.0	45.0	0.0	131.3	0.4
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	2.0	0.0	2.0	0.0	4.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	11.0	0.0	0.0	10.1	0.0	21.1	0.1
Aqueous Liquids	263.5	760.1	0.0	0.0	0.0	1,023.6	2.9
Total	7,703.8	13,955.2	5.7	13,395.3	0.0	35,060.0	100.0
% of Total	22.0	39.8	0.0	38.2	0.0	100.0	

Table C–14
1996 LLRW Activity Stored for Decay On Site – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	1.515	0.006	0.000	0.036	0.000	1.557	0.1
DAW–Uncomp. Bulk Materials	61.878	298.327	0.017	420.822	0.000	781.044	29.0
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	61.070	0.000	0.000	0.000	61.070	2.3
DAW–Uncompacted Solids	0.000	0.008	0.000	0.111	0.000	0.119	0.0
DAW–Medical Wastes	0.436	201.970	0.000	1,170.382	0.000	1,372.788	50.9
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.840	0.000	0.000	0.000	0.840	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.003	0.000	0.000	0.000	0.000	0.003	0.0
Solidified Ion Exchange Media	0.032	0.000	0.000	0.000	0.000	0.032	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.024	0.000	0.000	0.000	0.024	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.007	0.000	0.150	0.000	0.157	0.0
LSF/V's Inorganic	0.003	4.780	0.000	0.000	0.000	4.783	0.2
Other Organic Liquids	0.000	165.564	0.000	0.000	0.000	165.564	6.1
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.020	0.051	0.000	0.006	0.000	0.078	0.0
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.822	0.000	0.003	0.000	0.825	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	73.579	0.000	0.000	11.561	0.000	85.140	3.2
Aqueous Liquids	1.594	221.456	0.000	0.000	0.000	223.049	8.3
Total	139.059	954.924	0.017	1,603.071	0.000	2,697.072	100.0
% of Total	5.2	35.4	0.0	59.4	0.0	100.0	

Table C–15
1996 LLRW Volume Stored for Decay Off Site – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	289.3	0.0	2,171.5	0.0	2,460.8	93.4
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irradiated Rx Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	174.6	0.0	174.6	6.6
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	289.3	0.0	2,346.1	0.0	2,635.4	100.0
% of Total	0.0	11.0	0.0	89.0	0.0	100.0	

Table C–16
1996 LLRW Activity Stored for Decay Off Site – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.124	0.000	1.764	0.000	1.888	2.5
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	73.125	0.000	73.125	97.5
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Total	0.000	0.124	0.000	74.889	0.000	75.013	100.0
% of Total	0.0	0.2	0.0	99.8	0.0	100.0	

Table C–17
LLRW Volume Shipped for Disposal Prior to Treatment – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	1,311.8	72.3	0.0	0.0	0.0	1,384.1	0.5
DAW–Uncomp. Bulk Materials	2,128.7	15,743.5	0.0	760.1	34,709.7	53,342.0	18.3
DAW–Soils/Building Rubble	0.0	226,552.7	0.0	0.0	0.0	226,552.7	77.5
DAW–Compacted Solids	0.0	4.8	0.0	0.0	0.0	4.8	0.0
DAW–Uncompacted Solids	0.0	1,546.2	0.0	0.0	2,658.0	4,204.2	1.4
DAW–Medical Wastes	0.0	7.0	0.0	0.0	0.0	7.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	1,106.6	1,106.6	0.4
Other Dewatered Sludges	0.0	2,310.0	0.0	0.0	549.8	2,859.8	1.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	892.0	892.0	0.3
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	0.0	98.0	0.0	0.0	0.0	98.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	7.5	0.0	0.0	0.0	7.5	0.0
Incinerator Ash	0.0	0.0	0.0	86.6	0.0	86.6	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	123.0	0.0	7.5	0.0	130.5	0.0
Irradiated Rx Components	0.0	0.0	0.0	0.0	862.0	862.0	0.3
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	71.0	0.0	1.4	0.7	73.1	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	526.0	0.0	0.0	89.0	615.0	0.2
Total	3,440.5	247,062.0	0.0	855.6	40,867.8	292,225.9	100.0
% of Total	1.2	84.5	0.0	0.3	14.0	100.0	

Table C–18
On–Site Treatment Results for 1996 LLRW Shipped for Disposal– by Treatment Method
(cubic feet)

Treatment Description	Before	After	Volume Eliminated	% of Total	Reduction Ratio[1]
Compaction Up to 250 Tons	13092.8	5628.5	7464.3	71.8%	2.3
Sorting/Segregation	3151.6	214.9	2936.7	28.2%	14.7
TOTAL	**16,244.4**	**5,843.4**	**10,401.0**	**100.0%**	

[1] (initial volume/ final volume)

Table C–19
On–Site Treatment Results for 1996 LLRW Shipped for Disposal– by Waste Category
(cubic feet)

Waste Category	Before	After	Volume Eliminated	% of Total	Reduction Ratio[1]
DAW–Uncomp. Bulk Materials	53,544.5	44,318.4	9,226.1	88.7%	1.2
DAW–Comp. Bulk Materials	1,384.1	220.9	1,163.2	11.2%	6.3
Sealed Sources	73.1	61.4	11.7	0.1%	1.2
TOTAL	**55,001.7**	**44,600.7**	**10,401.0**	**100.0%**	

[1] (initial volume/ final volume)

Table C–20
Off–Site Treatment Results for 1996 LLRW Shipped for Disposal– by Treatment Method
(cubic feet)

Treatment Description	Before	After	Volume Eliminated	% of Total	Reduction Ratio[1]
Incineration	36,569.0	2,615.7	33,953.3	96.7%	14.0
Compaction Up to 250 Tons	2,167.0	1,441.1	725.9	2.1%	1.5
Compaction, Above 2500 Tons	1,934.3	1,654.6	279.7	0.8%	1.2
Other	263.0	112.8	150.2	0.4%	2.3
Sorting/Segregation	7.5	0.8	6.8	0.0%	10.0
Compaction 251 to 1000 Tons	80.2	74.6	5.6	0.0%	1.1
Macro–encapsulation	5.6	2.7	2.9	0.0%	2.1
TOTAL	**41,026.6**	**5,902.3**	**35,124.3**	**100.0%**	

[1] (initial volume/ final volume)

Table C–21
Off–Site Treatment Results for 1996 LLRW Shipped for Disposal– by Waste Category
(cubic feet)

Waste Category	Before	After	Volume Eliminated	% of Total	Reduction Ratio[1]
DAW–Uncomp. Bulk Materials	44,318.4	9,768.6	34,549.8	98.4%	4.5
Dewatered Filter Media	1,106.6	908.9	197.7	0.6%	1.2
DAW–Comp. Bulk Materials	220.9	104.7	116.2	0.3%	2.1
LSF/V's Organic	98.0	.0.3	97.7	0.3%	326.7
DAW–Uncompacted Solids	4,204.2	4,120.0	84.2	0.2%	1.0
Bio. Waste or Carcasses	130.5	67.4	63.1	0.2%	1.9
Other Organic Liquids	7.5	0.8	6.8	0.0%	10.0
DAW–Medical Wastes	7.0	1.0	6.0	0.0%	7.0
Sealed Sources	61.4	58.8	2.6	0.0%	1.0
TOTAL	**50,154.5**	**15,030.5**	**35,124.0**	**100.0%**	

[1] (initial volume/ final volume)

Table C–22
1996 LLRW Volume Shipped for Disposal – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	224.8	4,602.3	0.0	14.5	15.9	4,857.5	2.0
DAW–Uncomp. Bulk Materials	7.5	816.2	0.0	7.5	2,638.3	3,469.5	1.4
DAW–Soils/Building Rubble	0.0	226,552.7	0.0	0.0	0.0	226,552.7	91.8
DAW–Compacted Solids	0.0	4.8	0.0	0.0	13.8	18.6	0.0
DAW–Uncompacted Solids	0.0	1,546.2	0.0	0.0	2,560.0	4,106.2	1.7
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	899.6	899.6	0.4
Other Dewatered Sludges	0.0	2,310.0	0.0	0.0	549.8	2,859.8	1.2
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	892.0	892.0	0.4
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	488.7	0.0	0.0	89.0	577.7	0.2
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.8	0.0	0.0	0.0	0.8	0.0
Incinerator Ash	30.7	115.1	0.0	95.6	1,201.3	1,442.6	0.6
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	0.0	65.8	0.0	0.0	0.0	65.8	0.0
Irradiated Rx Components	0.0	0.0	0.0	0.0	862.0	862.0	0.3
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	56.4	0.0	1.4	1.0	58.8	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	37.3	0.0	0.0	0.0	37.3	0.0
Total	263.0	236,596.2	0.0	118.9	9,722.7	246,700.9	100.0
% of Total	0.1	95.9	0.0	0.0	3.9	100.0	

Table C–23
1996 LLRW Activity Shipped for Disposal – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Comp. Bulk Materials	0.810	14.032	0.000	0.057	0.002	14.900	0.1
DAW–Uncomp. Bulk Materials	0.000	3.030	0.000	0.005	19.154	22.189	0.1
DAW–Soils/Building Rubble	0.000	0.768	0.000	0.000	0.000	0.768	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.001	0.001	0.0
DAW–Uncompacted Solids	0.000	149.673	0.000	0.000	4.026	153.699	0.9
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	159.253	159.253	1.0
Other Dewatered Sludges	0.000	2.547	0.000	0.000	591.327	593.874	3.6
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	141.021	141.021	0.9
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	1,126.096	0.000	0.000	0.000	1,126.096	6.8
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.078	0.000	0.000	0.000	0.078	0.0
Incinerator Ash	0.524	0.720	0.000	0.193	0.943	2.380	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.000	0.002	0.000	0.000	0.000	0.002	0.0
Irradiated Rx Components	0.000	0.000	0.000	0.000	1,590.668	1,590.668	9.7
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.568	0.000	0.569	0.007	1.144	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	12,675.058	0.000	0.000	0.000	12,675.058	76.9
Total	1.334	13,972.573	0.000	0.823	2,506.400	16,481.130	100.0
% of Total	0.0	84.8	0.0	0.0	15.2	100.0	

Table C–24
1996 LLRW Volume Shipped for Disposal – by Waste Category and Disposal Class
(cubic feet)

Waste Category	Disposal Classification				Total	% of Total
	Class A	Class AH	Class B	Class C		
DAW–Comp. Bulk Materials	4,857.5	0.0	0.0	0.0	4,857.5	2.0
DAW–Uncomp. Bulk Materials	3,351.5	0.0	25.0	93.0	3,469.5	1.4
DAW–Soils/Building Rubble	226,552.7	0.0	0.0	0.0	226,552.7	91.8
DAW–Compacted Solids	18.6	0.0	0.0	0.0	18.6	0.0
DAW–Uncompacted Solids	4,085.0	0.0	21.2	0.0	4,106.2	1.7
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	411.6	0.0	0.0	488.0	899.6	0.4
Other Dewatered Sludges	2,727.4	0.0	132.4	0.0	2,859.8	1.2
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	256.0	0.0	131.0	505.0	892.0	0.4
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	291.5	0.0	286.2	0.0	577.7	0.2
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.8	0.0	0.0	0.0	0.8	0.0
Incinerator Ash	1,442.6	0.0	0.0	0.0	1,442.6	0.6
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	65.8	0.0	0.0	0.0	65.8	0.0
Irradiated Rx Components	805.0	0.0	0.0	57.0	862.0	0.3
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	58.8	0.0	0.0	0.0	58.8	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	5.5	0.0	31.8	0.0	37.3	0.0
Total	244,930.3	0.0	627.6	1,143.0	246,700.9	100.0
% of Total	99.3	0.0	0.3	0.5	100.0	

Table C–25
1996 LLRW Activity Shipped for Disposal – by Waste Category and Disposal Class
(curies)

Waste Category	Disposal Classification				Total	% of Total
	Class A	Class AH	Class B	Class C		
DAW–Comp. Bulk Materials	14.900	0.000	0.000	0.000	14.900	0.090
DAW–Uncomp. Bulk Materials	12.467	0.000	0.229	9.492	22.189	0.135
DAW–Soils/Building Rubble	0.768	0.000	0.000	0.000	0.768	0.005
DAW–Compacted Solids	0.001	0.000	0.000	0.000	0.001	0.000
DAW–Uncompacted Solids	14.691	0.000	139.008	0.000	153.699	0.933
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000
Dewatered Filter Media	35.621	0.000	0.000	123.632	159.253	0.966
Other Dewatered Sludges	3.264	0.000	590.609	0.000	593.874	3.603
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000
Cartridge Filters	11.108	0.000	54.773	75.140	141.021	0.856
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Liquids	3.890	0.000	1,122.206	0.000	1,126.096	6.833
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000
Other Organic Liquids	0.078	0.000	0.000	0.000	0.078	0.000
Incinerator Ash	2.380	0.000	0.000	0.000	2.380	0.014
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000
Bio. Waste or Carcasses	0.002	0.000	0.000	0.000	0.002	0.000
Irradiated Rx Components	0.668	0.000	0.000	1,590.000	1,590.668	9.651
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000
Sealed Sources	1.144	0.000	0.000	0.000	1.144	0.007
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000
Aqueous Liquids	0.058	0.000	12,675.000	0.000	12,675.058	76.906
Total	101.042	0.000	14,581.825	1,798.264	16,481.130	100.000
% of Total	0.613	0.000	88.476	10.911	100.000	

Table C–26
1996 LLRW Volume Shipped for Disposal – by Generator Category and Disposal Class
(cubic feet)

Generator Category	Disposal Classification				Total	% of Total
	Class A	Class AH	Class B	Class C		
Academic	263.0	0.0	0.0	0.0	263.0	0.1
Commercial	236,257.0	0.0	339.2	0.0	236,596.2	95.9
Government	0.0	0.0	0.0	0.0	0.0	0.0
Health	118.9	0.0	0.0	0.0	118.9	0.0
Utility	8,291.3	0.0	288.4	1,143.0	9,722.7	3.9
Total	244,930.3	0.0	627.6	1,143.0	246,700.9	100.0
% of Total	99.3	0.0	0.3	0.5	100.0	

Table C–27
1996 LLRW Activity Shipped for Disposal – by Generator Category and Disposal Class
(curies)

Generator Category	Disposal Classification				Total	% of Total
	Class A	Class AH	Class B	Class C		
Academic	1.334	0.000	0.000	0.000	1.334	0.0
Commercial	36.360	0.001	13,936.214	0.000	13,972.574	84.8
Government	0.000	0.000	0.000	0.000	0.000	0.0
Health	0.823	0.000	0.000	0.000	0.823	0.0
Utility	62.525	0.000	645.611	1,798.264	2,506.400	15.2
Total	101.042	0.001	14,581.825	1,798.264	16,481.131	100.0
% of Total	0.6	0.0	88.5	10.9	100.0	

Table C–28
Activity Half–Life Distribution of 1996 LLRW Shipped for Disposal – by Generator Category
(curies)

Generator Category	Half–life Distribution				Total	% of Total
	<1 Year	1 Year – <5 Years	5–<15 Years	>15 Years		
Academic	0.157	0.003	1.102	0.072	1.334	0.0
Commercial	2.259	0.090	13,956.712	13.513	13,972.573	84.8
Government	0.000	0.000	0.000	0.000	0.000	0.0
Health	0.570	0.001	0.185	0.067	0.823	0.0
Utility	38.799	1,155.810	1,109.508	202.283	2,506.400	15.2
Total	41.785	1,155.904	15,067.506	215.935	16,481.130	100.0
% of Total	0.3	7.0	91.4	1.3	100.0	

Table C–29
Activity Half–Life Distribution of 1996 LLRW Shipped for Disposal – by Waste Category
(curies)

Generator Category	Half–life Distribution				Total	% of Total
	<1 Year	1 Year – <5 Years	5–<15 Years	>15 Years		
DAW–Comp. Bulk Materials	0.399	0.016	6.902	7.584	14.900	0.1
DAW–Uncomp. Bulk Materials	0.014	9.981	7.560	4.633	22.189	0.1
DAW–Soils/Building Rubble	0.002	0.000	0.000	0.766	0.768	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.001	0.001	0.0
DAW–Uncompacted Solids	1.192	1.900	148.181	2.426	153.699	0.9
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	2.859	116.800	26.090	13.504	159.253	1.0
Other Dewatered Sludges	34.589	244.383	289.800	25.102	593.874	3.6
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	1.327	102.040	27.015	10.638	141.021	0.9
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.081	0.032	1,125.152	0.831	1,126.096	6.8
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.078	0.078	0.0
Incinerator Ash	0.282	0.569	1.257	0.272	2.380	0.0
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.0
Bio. Waste or Carcasses	0.002	0.000	0.000	0.000	0.002	0.0
Irradiated Rx Components	0.006	680.142	760.432	150.088	1,590.668	9.7
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	1.031	0.040	0.063	0.010	1.144	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	12,675.055	0.003	12,675.058	76.9
% of Total	41.785	1,155.904	15,067.506	215.935	16,481.130	100.0
Total	0.3	7.0	91.4	1.3	100.0	

Table C–30
Surface Radiation Level Distribution of 1996 LLRW Volume Shipped for Disposal – by Waste Category
(cubic feet)

Waste Category	Volume					
	Shipping Container Radiation Level (millirem/hr)					
	Bkgd[1]	<1	1–<10	10–<100	100–<1000	> 1000
DAW–Comp. Bulk Materials	194.9	4,390.4	144.7	127.5	0.0	0.0
DAW–Uncomp. Bulk Materials	463.0	566.6	4.1	2,357.0	281.3	0.0
DAW–Soils/Building Rubble	0.0	226,454.7	98.0	0.0	0.0	0.0
DAW–Compacted Solids	18.6	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	351.2	7.5	0.0	2,560.0	1,187.5	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Lg. Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	899.6
Other Dewatered Sludges	0.0	0.0	2,310.0	285.0	0.0	264.8
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	221.0	264.0	407.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	413.7	104.0	0.0	52.5	7.5	0.0
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.8	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	39.6	106.2	95.5	1,201.3	0.0	0.0
Incin. Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0
Bio. Waste or Carcasses	65.8	0.0	0.0	0.0	0.0	0.0
Irradiated Rx Components	0.0	0.0	0.0	0.0	805.0	57.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	1.0	1.4	0.0	41.4	15.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	37.3	0.0	0.0	0.0	0.0	0.0
Total	1,585.9	231,630.8	2,652.3	6,845.7	2,560.3	1,628.4
% of Total	0.6	93.8	1.1	2.8	1.0	0.7

[1] Bkgd means radiation levels external to the waste container are equivalent to background radiation at the point of shipment.

Table C–31
Surface Radiation Level Distribution of 1996 LLRW Activity Shipped for Disposal – by Waste Category
(curies)

Waste Category	Activity					
	Shipping Container Radiation Level (millirem/hr)					
	Bkgd[1]	<1	1–<10	10–<100	100–<1000	> 1000
DAW–Comp. Bulk Materials	0.778	13.366	0.596	0.160	0.000	0.000
DAW–Uncomp. Bulk Materials	2.670	0.357	0.008	8.056	11.098	0.000
DAW–Soils/Building Rubble	0.000	0.768	0.000	0.000	0.000	0.000
DAW–Compacted Solids	0.001	0.000	0.000	0.000	0.000	0.000
DAW–Uncompacted Solids	143.113	5.307	0.000	4.026	1.252	0.000
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000
Contaminated Lg. Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	159.253
Other Dewatered Sludges	0.000	0.000	2.547	0.717	0.000	590.609
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000
Cartridge Filters	0.000	0.000	0.000	1.929	26.940	112.152
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Liquids	1,125.454	0.024	0.000	0.554	0.064	0.000
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000
Other Organic Liquids	0.078	0.000	0.000	0.000	0.000	0.000
Incinerator Ash	0.329	0.460	0.648	0.943	0.000	0.000
Incin. Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000
Bio. Waste or Carcasses	0.002	0.000	0.000	0.000	0.000	0.000
Irradiated Rx Components	0.000	0.000	0.000	0.000	0.668	1,590.000
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000
Sealed Sources	0.007	0.569	0.000	0.373	0.195	0.000
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000
Aqueous Liquids	12,675.058	0.000	0.000	0.000	0.000	0.000
Total	13,947.490	20.851	3.800	16.758	40.217	2,452.014
% of Total	84.627	0.127	0.023	0.102	0.244	14.878

[1] Bkgd means radiation levels external to the waste container are equivalent to background radiation at the point of shipment.

Appendix D
1996 Mixed Waste Characteristic Data

Massachusetts radioactive material users reported that they managed 7,047 cubic feet of mixed waste containing 7,831 curies of activity. This was mixed waste that was generated in 1996 and from prior years. Tables in this appendix summarize and present mixed waste management and characteristic data for 1996.

Table D–1
1996 Licensee Mixed Waste Management Summary – by Generator Category
(number of organizations)

	Acad	Comm	Govt	Health	Utility	Total	% of Total
Total	14	29	0	11	2	56	100.0
On–Site Management							
Storage	4	13	0	2	1	20	35.7
Storage for Decay	0	4	0	0	0	4	7.1
Off–Site Management							
Incineration for Disposal	10	12	0	10	0	32	57.1
Shipped for Disposal	0	0	0	2	1	3	5.4

Note: Column percentages total >100% since some organizations used more than one management method.

Table D–2
1996 Mixed Waste Volume Summary – by Generator Category
(cubic feet)

	Acad	Comm	Govt	Health	Utility	Total	% of Total
Total Reported	852.9	5,666.1	0.0	424.1	104.0	7,047.2	100.0
On–Site Management							
Mixed Waste Storage	17.3	5,102.0	0.0	19.8	15.0	5,154.1	73.1
Storage for Decay	0.0	74.8	0.0	0.0	0.0	74.8	1.1
On–Site Total	17.3	5,176.8	0.0	19.8	15.0	5,228.9	74.2
Off–Site Management							
Incineration for Disposal	835.7	489.3	0.0	396.8	0.0	1,721.8	24.4
Off–Site Total	835.7	489.3	0.0	396.8	0.0	1,721.8	24.4
Received for Disposal	0.0	0.0	0.0	7.5	89.0	96.5	1.4

Table D–3
1996 Mixed Waste Activity Summary – by Generator Category
(curies)

	Acad	Comm	Govt	Health	Utility	Total	% of Total
Total Reported	0.157	7,831.113	0.000	0.072	0.000	7,831.342	100.000
On–Site Management							
Storage	0.001	7,829.278	0.000	0.004	0.000	7,829.283	99.973
Storage for Decay	0.000	1.793	0.000	0.000	0.000	1.793	0.023
On–Site Total	0.001	7,831.072	0.000	0.004	0.000	7,831.076	99.996
Off–Site Management							
Incineration for Disposal	0.156	0.042	0.000	0.063	0.000	0.260	0.003
Storage for Decay	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Off–Site Total	0.156	0.042	0.000	0.063	0.000	0.260	0.003
Received for Disposal	0.000	0.000	0.000	0.005	0.000	0.005	0.000

Table D–4
1996 Total Mixed Waste Volume Reported – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	14.3	0.0	7.5	0.0	21.8	0.3
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	15.0	15.0	0.2
DAW–Medical Wastes	0.0	1.0	0.0	0.0	0.0	1.0	0.0
Contaminated Large Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	860.4	550.3	0.0	765.5	0.0	2,176.2	28.9
LSF/V's Inorganic	0.0	72.0	0.0	83.1	0.0	155.1	2.1
Other Organic Liquids	0.0	4,692.1	0.0	0.0	0.0	4,692.1	62.2
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biological Waste or Carcasses	0.0	0.1	0.0	17.9	0.0	18.0	0.2
Irradiated Reactor Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	375.0	0.0	0.0	89.0	464.0	6.2
Total	860.4	5,704.6	0.0	874.0	104.0	7,543.1	100.0
% of Total	11.4	75.6	0.0	11.6	1.4	100.0	

Note: includes 1996 production and storage from prior years.

Table D–5
1996 Total Mixed Waste Activity Reported – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.007	0.000	0.005	0.000	0.012	0.0
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.007	0.007	0.0
DAW–Medical Wastes	0.000	0.003	0.000	0.000	0.000	0.003	0.0
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.159	0.100	0.000	0.066	0.000	0.324	0.0
LSF/V's Inorganic	0.000	0.011	0.000	0.017	0.000	0.027	0.0
Other Organic Liquids	0.000	7,679.401	0.000	0.000	0.000	7,679.401	98.1
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Biological Waste or Carcasses	0.000	0.000	0.000	0.002	0.000	0.002	0.0
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	151.603	0.000	0.000	0.000	151.603	1.9
Total	0.159	7,831.123	0.000	0.089	0.007	7,831.379	100.0
% of Total	0.0	100.0	0.0	0.0	0.0	100.0	

Note: includes 1996 production and storage from prior years.

Table D–6
1996 Mixed Waste Volume Incinerated for Disposal Off Site – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Large Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/Vs Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/Vs Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biological Waste or Carcasses	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irradiated Reactor Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% of Total	0.0	0.0	0.0	0.0	0.0	0.0	

Table D–7
1996 Mixed Waste Activity Incinerated for Disposal Off Site – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Biological Waste or Carcasses	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.0
% of Total	0.0	0.0	0.0	0.0	0.0	0.0	

Table D–8
1996 Mixed Waste Volume Stored for Decay On Site – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	12.3	0.0	0.0	0.0	12.3	16.4
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	1.0	0.0	0.0	0.0	1.0	1.3
Contaminated Large Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	24.0	0.0	0.0	0.0	24.0	32.1
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biological Waste or Carcasses	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irradiated Reactor Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	37.5	0.0	0.0	0.0	37.5	50.1
Total	0.0	74.8	0.0	0.0	0.0	74.8	100.0
% of Total	0.0	100.0	0.0	0.0	0.0	100.0	

Table D–9
1996 Mixed Waste Activity Stored for Decay On Site – by Waste and Generator Category
(curies)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Soils/Building Rubble	0.000	0.006	0.000	0.000	0.000	0.006	0.3
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.003	0.000	0.000	0.000	0.003	0.1
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/Vs Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/Vs Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	1.640	0.000	0.000	0.000	1.640	91.4
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Biological Waste or Carcasses	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.145	0.000	0.000	0.000	0.145	8.1
Total	0.000	1.793	0.000	0.000	0.000	1.793	100.0
% of Total	0.0	100.0	0.0	0.0	0.0	100.0	

Table D–10
1996 Mixed Waste Volume Shipped for Disposal – by Waste and Generator Category
(cubic feet)

Waste Category	Generator Category					Total	% of Total
	Acad	Comm	Govt	Health	Utility		
DAW–Compacted Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	0.0	0.0	0.0	7.5	0.0	7.5	7.8
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Large Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	0.0	0.0	0.0	89.0	89.0	92.2
LSF/V's Organic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSF/V's Inorganic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incin. Ash–Solid Agg./Comp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biological Waste or Carcasses	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irradiated Reactor Components	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	7.5	89.0	96.5	100.0
% of Total	0.0	0.0	0.0	7.8	92.2	100.0	

Table D–11
1996 Mixed Waste Activity Shipped for Disposal – by Waste and Generator Category
(curies)

Waste Category	Generator Category						
	Acad	Comm	Govt	Health	Utility	Total	% of Total
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncomp. Bulk Materials	0.000	0.000	0.000	0.005	0.000	0.005	98.3
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000	1.7
LSF/V's Organic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
LSF/V's Inorganic	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Incin. Ash–Solid Agg./Comp.	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Biological Waste or Carcasses	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Total	0.000	0.000	0.000	0.005	0.000	0.005	100.0
% of Total	0.0	0.0	0.0	98.3	1.7	100.0	

Table D–12
1996 Mixed Waste Volume Shipped for Disposal – by Waste Category and Disposal Class
(cubic feet)

Waste Category	Disposal Classification			Total	% of Total
	Class AH	Class BH	Class CH		
DAW–Compacted Bulk Materials	0.0	0.0	0.0	0.0	0.0
DAW–Uncomp. Bulk Materials	7.5	0.0	0.0	7.5	7.8
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0
Contaminated Large Metal Objects	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	89.0	0.0	0.0	89.0	92.2
Liquid Scintillation Fluid/Vials Organic	0.0	0.0	0.0	0.0	0.0
Liquid Scintillation Fluid/Vials Inorganic	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solidified	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solid Agglomerated/Compressed	0.0	0.0	0.0	0.0	0.0
Biological Waste or Carcasses	0.0	0.0	0.0	0.0	0.0
Irradiated Reactor Components	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0
Total	96.5	0.0	0.0	96.5	100.0
% of Total	100.0	0.0	0.0	100.0	

Table D–13
1996 Mixed Waste Activity Shipped for Disposal – by Waste Category and Disposal Class
(curies)

Waste Category	Disposal Classification			Total	% of Total
	Class AH	Class BH	Class CH		
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Bulk Materials	0.005	0.000	0.000	0.005	98.3
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.0
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	1.7
Liquid Scintillation Fluid/Vials Organic	0.000	0.000	0.000	0.000	0.0
Liquid Scintillation Fluid/Vials Inorganic	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solid Agglomerated/Compressed	0.000	0.000	0.000	0.000	0.0
Biological Waste or Carcasses	0.000	0.000	0.000	0.000	0.0
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	0.000	0.000	0.0
Total	0.005	0.000	0.000	0.005	100.0
% of Total	100.0	0.0	0.0	100.0	

Table D–14
1996 Mixed Waste Volume Shipped for Disposal – by Generator Category and Disposal Class
(cubic feet)

Generator Category	Disposal Classification			Total	% of Total
	Class AH	Class BH	Class CH		
Academic	0.0	0.0	0.0	0.0	0.0
Commercial	0.0	0.0	0.0	0.0	0.0
Government	0.0	0.0	0.0	0.0	0.0
Health	7.5	0.0	0.0	7.5	7.8
Utility	89.0	0.0	0.0	89.0	92.2
Total	96.5	0.0	0.0	96.5	100.0
% of Total	100.0	0.0	0.0	100.0	

Table D–15
1996 Mixed Waste Activity Shipped for Disposal – by Generator Category and Disposal Class
(curies)

Generator Category	Disposal Classification			Total	% of Total
	Class AH	Class BH	Class CH		
Academic	0.000	0.000	0.000	0.000	0.0
Commercial	0.000	0.000	0.000	0.000	0.0
Government	0.000	0.000	0.000	0.000	0.0
Health	0.005	0.000	0.000	0.005	98.3
Utility	0.000	0.000	0.000	0.000	1.7
Total	0.005	0.000	0.000	0.005	100.0
% of Total	100.0	0.0	0.0	100.0	

Table D–16
Activity Half–Life Distribution of 1996 Mixed Waste Shipped for Disposal – by Generator Category
(curies)

Generator Category	Half–life Distribution				Total	% of Total
	<1 Year	1 Year – <5 Years	5 Years – <15 Years	>15 Years		
Academic	0.000	0.000	0.000	0.000	0.000	0.0
Commercial	0.000	0.000	0.000	0.000	0.000	0.0
Government	0.000	0.000	0.000	0.000	0.000	0.0
Health	0.000	0.000	0.004	0.001	0.005	98.3
Utility	0.000	0.000	0.000	0.000	0.000	1.7
Total	0.000	0.000	0.004	0.001	0.005	100.0
% of Total	0.8	0.2	82.7	16.3	100.0	

Table D–17
Activity Half–Life Distribution of 1996 Mixed Waste Shipped for Disposal – by Waste Category
(curies)

Generator Category	Half–life Distribution				Total	% of Total
	<1 Year	1 Year – <5 Years	5 Years – <15 Years	>15 Years		
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Bulk Materials	0.000	0.000	0.004	0.001	0.005	98.3
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.0
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.0
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.0
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.0
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.0
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.0
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.0
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	1.7
Liquid Scintillation Fluid/Vials Organic	0.000	0.000	0.000	0.000	0.000	0.0
Liquid Scintillation Fluid/Vials Inorganic	0.000	0.000	0.000	0.000	0.000	0.0
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.0
Incinerator Ash–Solid Agglomerated/Compr.	0.000	0.000	0.000	0.000	0.000	0.0
Biological Waste or Carcasses	0.000	0.000	0.000	0.000	0.000	0.0
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.000	0.0
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.0
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.0
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.0
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.0
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.0
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.0
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.0
Total	0.000	0.000	0.004	0.001	0.005	100.0
% of Total	0.8	0.2	82.7	16.3	100.0	

Table D–18
Surface Radiation Level Distribution of 1996 Mixed Waste Volume Shipped for Disposal – by Waste Category
(cubic feet)

Waste Category	Volume					
	Waste Container Radiation Level (millirem/hr)					
	Bkgd[1]	>Bkg–<1	1–<10	10–<100	100–<1000	> 1000
DAW–Compacted Bulk Materials	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Bulk Materials	0.0	7.5	0.0	0.0	0.0	0.0
DAW–Soils/Building Rubble	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Compacted Solids	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Uncompacted Solids	0.0	0.0	0.0	0.0	0.0	0.0
DAW–Medical Wastes	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Large Metal Objects	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0
Dewatered Filter Media	0.0	0.0	0.0	0.0	0.0	0.0
Other Dewatered Sludges	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Ion Exchange Media	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Filter Media	0.0	0.0	0.0	0.0	0.0	0.0
Cartridge Filters	0.0	0.0	0.0	0.0	0.0	0.0
Other Solidified Sludges	0.0	0.0	0.0	0.0	0.0	0.0
Absorbed Liquids	0.0	0.0	0.0	0.0	0.0	0.0
Solidified Liquids	0.0	89.0	0.0	0.0	0.0	0.0
Liquid Scintillation Fluid/Vials Organic	0.0	0.0	0.0	0.0	0.0	0.0
Liquid Scintillation Fluid/Vials Inorganic	0.0	0.0	0.0	0.0	0.0	0.0
Other Organic Liquids	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solidified	0.0	0.0	0.0	0.0	0.0	0.0
Incinerator Ash–Solid Agglomerated/Compr.	0.0	0.0	0.0	0.0	0.0	0.0
Biological Waste or Carcasses	0.0	0.0	0.0	0.0	0.0	0.0
Irradiated Reactor Components	0.0	0.0	0.0	0.0	0.0	0.0
Other Irradiated Materials	0.0	0.0	0.0	0.0	0.0	0.0
Gases in Sealed Containers	0.0	0.0	0.0	0.0	0.0	0.0
Sealed Sources	0.0	0.0	0.0	0.0	0.0	0.0
Contaminated Oil/Lubricant	0.0	0.0	0.0	0.0	0.0	0.0
Gas Filters	0.0	0.0	0.0	0.0	0.0	0.0
Medical Isotope Generators	0.0	0.0	0.0	0.0	0.0	0.0
Aqueous Liquids	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	96.5	0.0	0.0	0.0	0.0
% of Total	0.0	100.0	0.0	0.0	0.0	0.0

[1] Bkgd means radiation levels external to the waste container are equivalent to background radiation at the point of shipment.

Table D–19
Surface Radiation Level Distribution of 1996 Mixed Waste Activity Shipped for Disposal – by Waste Category
(curies)

Waste Category	Activity					
	Waste Container Radiation Level (millirem/hr)					
	Bkgd[1]	>Bkg–<1	1–<10	10–<100	100–<1000	> 1000
DAW–Compacted Bulk Materials	0.000	0.000	0.000	0.000	0.000	0.000
DAW–Uncompacted Bulk Materials	0.000	0.005	0.000	0.000	0.000	0.000
DAW–Soils/Building Rubble	0.000	0.000	0.000	0.000	0.000	0.000
DAW–Compacted Solids	0.000	0.000	0.000	0.000	0.000	0.000
DAW–Uncompacted Solids	0.000	0.000	0.000	0.000	0.000	0.000
DAW–Medical Wastes	0.000	0.000	0.000	0.000	0.000	0.000
Contaminated Large Metal Objects	0.000	0.000	0.000	0.000	0.000	0.000
Dewatered Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000
Dewatered Filter Media	0.000	0.000	0.000	0.000	0.000	0.000
Other Dewatered Sludges	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Ion Exchange Media	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Filter Media	0.000	0.000	0.000	0.000	0.000	0.000
Cartridge Filters	0.000	0.000	0.000	0.000	0.000	0.000
Other Solidified Sludges	0.000	0.000	0.000	0.000	0.000	0.000
Absorbed Liquids	0.000	0.000	0.000	0.000	0.000	0.000
Solidified Liquids	0.000	0.000	0.000	0.000	0.000	0.000
Liquid Scintillation Fluid/Vials Organic	0.000	0.000	0.000	0.000	0.000	0.000
Liquid Scintillation Fluid/Vials Inorganic	0.000	0.000	0.000	0.000	0.000	0.000
Other Organic Liquids	0.000	0.000	0.000	0.000	0.000	0.000
Incinerator Ash	0.000	0.000	0.000	0.000	0.000	0.000
Incinerator Ash–Solidified	0.000	0.000	0.000	0.000	0.000	0.000
Incinerator Ash–Solid Agglomerated/Compr.	0.000	0.000	0.000	0.000	0.000	0.000
Biological Waste or Carcasses	0.000	0.000	0.000	0.000	0.000	0.000
Irradiated Reactor Components	0.000	0.000	0.000	0.000	0.000	0.000
Other Irradiated Materials	0.000	0.000	0.000	0.000	0.000	0.000
Gases in Sealed Containers	0.000	0.000	0.000	0.000	0.000	0.000
Sealed Sources	0.000	0.000	0.000	0.000	0.000	0.000
Contaminated Oil/Lubricant	0.000	0.000	0.000	0.000	0.000	0.000
Gas Filters	0.000	0.000	0.000	0.000	0.000	0.000
Medical Isotope Generators	0.000	0.000	0.000	0.000	0.000	0.000
Aqueous Liquids	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.005	0.000	0.000	0.000	0.000
% of Total	0.0	100.0	0.0	0.0	0.0	0.0

[1] Bkgd means radiation levels external to the waste container are equivalent to background radiation at the point of shipment.

Appendix E
Radioactivity Information

Table E–1
Inventory of Radionuclides With Half–Lives of 90 Days or Less Contained in 1996 LLRW
Shipped for Disposal – by Generator Category
(curies)

Radionuclide	Half–Life (days)	Generator Category					Total
		Acad	Comm	Govt	Health	Utility	
Miscellaneous	<3 Hou	0.0000	0.0000	0.0000	0.0000	0.0000	<0.0001
La–140	1.68	0.0000	0.0000	0.0000	0.0000	0.0000	<0.0001
Ba–140	12.75	0.0000	0.0000	0.0000	0.0000	0.0000	<0.0001
P–32	14.28	0.0205	0.0807	0.0000	0.0000	0.0000	0.1012
Rb–86	18.65	0.0000	0.0200	0.0000	0.0000	0.0000	0.0200
P–33	25.3	0.0000	0.0294	0.0000	0.0000	0.0000	0.0294
Cr–51	27.7	0.0000	0.0365	0.0000	0.0005	1.0600	1.0970
Ce–141	32.5	0.0000	0.0000	0.0000	0.0000	0.0059	0.0059
Nb–95	34.97	0.0001	0.0020	0.0000	0.0000	0.2550	0.2571
Ru–103	39.27	0.0000	0.0103	0.0000	0.0000	0.0000	0.0103
Fe–59	44.51	0.0000	0.0314	0.0000	0.0000	2.6234	2.6548
Hg–203	46.61	0.0000	0.0000	0.0000	0.0000	0.0045	0.0045
Sr–89	50.52	0.0000	0.0000	0.0000	0.0000	0.0000	<0.0001
I–125	60.1	0.0211	0.0481	0.0000	0.0002	0.0000	0.0695
Sb–124	60.2	0.0000	0.0000	0.0000	0.0000	0.0093	0.0093
Zr–95	64.02	0.0000	0.0020	0.0000	0.0000	0.0000	0.0020
Sr–85	64.84	0.0000	0.0156	0.0000	0.0000	0.0000	0.0156
Co–58	70.88	0.0000	0.0000	0.0000	0.0000	1.0285	1.0285
Ir–192	73.83	0.0000	0.3240	0.0000	0.5688	0.0000	0.8928
Sc–46	83.81	0.0000	0.0201	0.0000	0.0000	0.0000	0.0201
S–35	87.2	0.0260	0.1867	0.0000	0.0000	0.0000	0.2127
TOTAL		0.0678	0.8067	0.0000	0.5696	4.9867	6.4308

Table E–2

Inventory of Radionuclides With Half–Lives Greater Than 90 Days and Less Than Five Years Contained in 1996 LLRW Shipped for Disposal – by Generator Category

(curies)

Radionuclide	Half–Life (days)	Generator Category					Total
		Acad	Comm	Govt	Health	Utility	
Sn–113	115	0.0000	0.0110	0.0000	0.0000	0.0000	0.0110
Se–75	120	0.0044	0.0000	0.0000	0.0000	0.0000	0.0044
Cm–242	163	0.0000	0.0000	0.0000	0.0000	0.0032	0.0032
Ca–45	163	0.0028	0.0018	0.0000	0.0003	0.0000	0.0049
Gd–153	242	0.0000	0.0100	0.0000	0.0000	0.0000	0.0100
Zn–65	244	0.0066	0.1773	0.0000	0.0000	1.9200	2.1039
Ag–110m	250	0.0004	0.0050	0.0000	0.0000	0.4990	0.5044
Co–57	271	0.0750	0.8772	0.0000	0.0003	0.0273	0.9798
Ge–68	271	0.0000	0.0030	0.0000	0.0000	0.0000	0.0030
Ce–144	285	0.0000	0.0000	0.0000	0.0000	3.4835	3.4835
Mn–54	312	0.0000	0.3667	0.0000	0.0000	27.8796	28.2462
Ru–106	372	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cd–109	462	0.0000	0.0050	0.0000	0.0000	0.0000	0.0050
Cs–134	753	0.0000	0.0120	0.0000	0.0000	0.2430	0.2551
Na–22	951	0.0022	0.0411	0.0000	0.0010	0.0000	0.0443
Pm–147	958	0.0000	0.0004	0.0000	0.0000	0.0000	0.0004
Fe–55	996	0.0004	0.0317	0.0000	0.0000	1,152.7650	1,152.7970
Sb–125	1007	0.0000	0.0000	0.0000	0.0000	2.8019	2.8019
TOTAL		0.0918	1.5421	0.0000	0.0016	1,189.6225	1,191.2580

Table E–3
Inventory of Radionuclides With Greater Than Five Year Half–Lives Contained in 1996 LLRW Shipped for Disposal – by Generator Category
(curies)

Radionuclide	Half–Life (Years)	Generator Category					Total
		Acad	Comm	Govt	Health	Utility	
Co–60	5.27	0.0024	0.5376	0.0000	0.0000	1,107.0543	1,107.5944
Ba–133	10.5	0.0000	0.0007	0.0000	0.0000	0.0000	0.0007
Kr–85	10.7	0.0000	0.0135	0.0000	0.0000	0.0000	0.0135
H–3	12.3	1.1001	13,956.1597	0.0000	0.1846	0.1410	13,957.5854
Pu–241	14.4	0.0000	0.0000	0.0000	0.0000	2.3125	2.3125
Cm–234/44	17.3	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
Sr–90	29.1	0.0000	0.0000	0.0000	0.0000	2.7483	2.7483
Cs–137	30.2	0.0008	0.0502	0.0000	0.0000	18.4799	18.5310
Pu–238	87.7	0.0000	0.0000	0.0000	0.0000	0.0078	0.0078
Ni–63	100	0.0000	0.7573	0.0000	0.0000	180.8841	181.6414
Am–241	432	0.0000	0.0000	0.0000	0.0000	0.0127	0.0127
Ra–226	1600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C–14	5730	0.0462	9.0243	0.0000	0.0667	0.0000	9.1372
Pu–239/40	6560	0.0000	0.0000	0.0000	0.0000	0.0092	0.0092
Th–230	75400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ni–59	76000	0.0000	0.0000	0.0000	0.0000	0.1400	0.1400
Tc–99	213000	0.0237	0.0218	0.0000	0.0000	0.0000	0.0455
U–234	246000	0.0000	0.4587	0.0000	0.0000	0.0000	0.4587
Cl–36	301000	0.0007	0.1005	0.0000	0.0000	0.0000	0.1012
I–129	15700000	0.0000	0.0064	0.0000	0.0000	0.0000	0.0064
U–235	704000000	0.0000	0.0231	0.0000	0.0004	0.0000	0.0235
U–238	4470000000	0.0001	3.0706	0.0000	0.0000	0.0000	3.0707
Th–232	10400000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
U Nat	4470000000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001
TOTAL		1.1742	13,970.2245	0.0000	0.2517	1,311.7912	15,283.4415

Table E–4
Inventory of Radionuclides With Greater Than Five Year Half–Lives Contained in 1995 LLRW Shipped for Disposal – by Disposal Class
(curies)

Radionuclide	Half–Life (Years)	Disposal Classification				Total	% of Total
		Class A	Class AH	Class B	Class C		
Co–60	5.27	24.0674	0.0000	300.0270	783.5000	1,107.5944	7.2
Ba–133	10.5	0.0007	0.0000	0.0000	0.0000	0.0007	0.0
Kr–85	10.7	0.0135	0.0000	0.0000	0.0000	0.0135	0.0
H–3	12.3	21.2309	0.0000	13,936.3545	0.0000	13,957.5854	91.3
Pu–241	14.4	0.1487	0.0000	0.4518	1.7120	2.3125	0.0
Cm–234/44	17.3	0.0000	0.0000	0.0014	0.0000	0.0014	0.0
Sr–90	29.1	0.1464	0.0000	2.5600	0.0419	2.7483	0.0
Cs–137	30.2	0.5610	0.0000	16.9000	1.0700	18.5310	0.1
Pu–238	87.7	0.0001	0.0000	0.0078	0.0000	0.0078	0.0
Ni–63	100	5.6804	0.0000	6.2610	169.7000	181.6414	1.2
Am–241	432	0.0003	0.0000	0.0124	0.0000	0.0127	0.0
Ra–226	1600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
C–14	5730	9.1372	0.0000	0.0000	0.0000	9.1372	0.1
Pu–239/40	6560	0.0001	0.0000	0.0091	0.0000	0.0092	0.0
Th–230	75400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
Ni–59	76000	0.0000	0.0000	0.0000	0.1400	0.1400	0.0
Tc–99	213000	0.0455	0.0000	0.0000	0.0000	0.0455	0.0
U–234	246000	0.4587	0.0000	0.0000	0.0000	0.4587	0.0
Cl–36	301000	0.1012	0.0000	0.0000	0.0000	0.1012	0.0
I–129	15700000	0.0064	0.0000	0.0000	0.0000	0.0064	0.0
U–235	704000000	0.0235	0.0000	0.0000	0.0000	0.0235	0.0
U–238	4470000000	3.0707	0.0000	0.0000	0.0000	3.0707	0.0
U Nat	4470000000	0.0001	0.0000	0.0000	0.0000	0.0001	0.0
Th–232	10400000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
TOTAL		64.6927	0.0000	14,262.5849	956.1639	15,283.4415	100.0

Appendix F
Impact of Radioactive Decay

The tables in Appendix F illustrate how radioactivity in LLRW shipped for disposal in 1996 will decay over time. Since the decay process transforms radionuclides either directly or via one or more radioactive "daughter" radionuclides into stable atoms that no longer emit radiation, a given quantity of LLRW will emit less radiation and become less hazardous over time.

Figure F-1 illustrates how the quantity of activity reported in 1996 LLRW shipped for disposal will decrease over time, due to natural decay processes. As shown by the graphs, the combination of reported radionuclides within 1996 Massachusetts LLRW will experience substantial decay over 300 and 500 years.

Figure F–1
Decay of 1996 Class A,B, and C LLRW – by Activity[1] Shipped for Disposal
(curies)

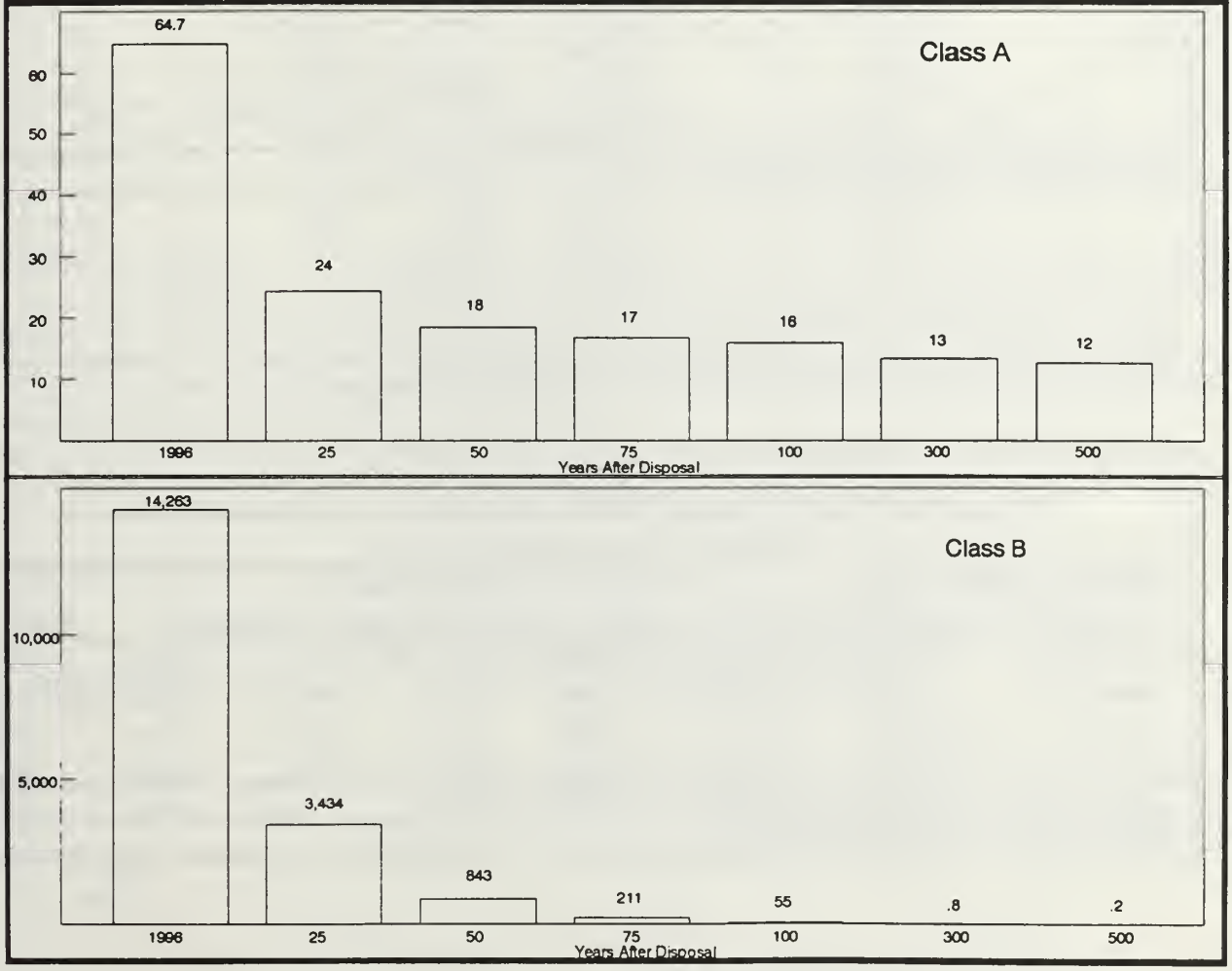
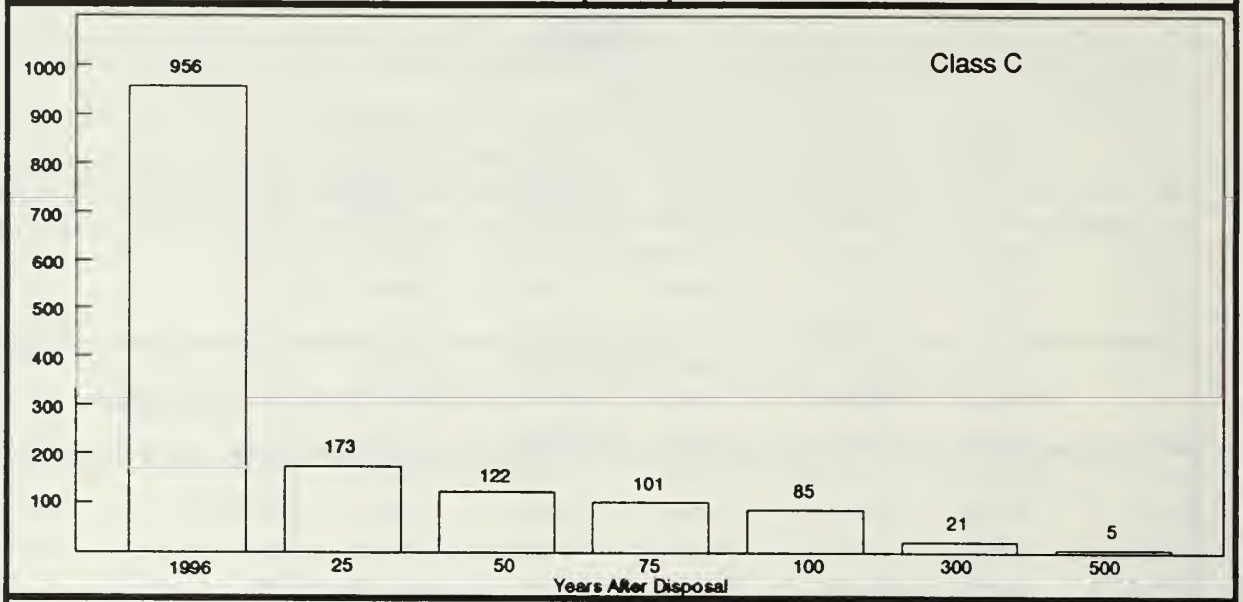


Figure F–1
Decay of 1996 Class A,B, and C LLRW – by Activity Shipped for Disposal
(Continued)
(curies)



[1] Radionuclides with greater than 5 year half–lives.

Table F-1 shows the percentage of activity remaining over the course of 500 years in 1996 LLRW shipped for disposal. The Class A activity remains almost constant during this time frame due to the contributions of C-14 and U-238 with half-lives of 5,730 years and 4.47 billion years, respectively.

Table F–1
Decay of 1996 LLRW Activity[1] Shipped for Disposal – by Disposal Class
(percent of initial activity remaining)

Disposal Class	Initial Activity (curies)	Years After Disposal					
		25	50	75	100	300	500
Class A	64.6927	37.3%	28.4%	25.6%	24.3%	20.4%	19.3%
Class AH	0.0000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Class B	14,262.5849	24.1%	5.9%	1.5%	0.4%	0.0%	0.0%
Class C	956.1639	18.1%	12.7%	10.6%	8.9%	2.2%	0.6%
TOTAL	15,283.442	23.8%	6.4%	2.2%	1.0%	0.2%	0.1%

[1] Radionuclides with greater than 5 year half–lives.

Table F–2
Radionuclides Remaining in 1996 Activity Shipped for Disposal after 100 and 500 Years
(curies)

Radionuclide	Half–life (years)	1996 Initial Activity	100 Years After Disposal	500 Years After Disposal	% of Total at 500 Years
C–14	5,730.0	9.1372	9.0273	8.6009	47.42%
Ni–63	100.0	181.6414	90.8207	5.6763	31.30%
U–238	4.5E+09	3.0707	3.0707	3.0707	16.93%
U–234	246,000.0	0.4587	0.4586	0.4581	2.53%
Ni–59	76,000.0	0.1400	0.1399	0.1394	0.77%
Cl–36	301,000.0	0.1012	0.1011	0.1010	0.56%
Tc–99	213,000.0	0.0455	0.0455	0.0454	0.25%
U–235	7.0E+08	0.0235	0.0235	0.0235	0.13%
Pu–239/40	6,560.0	0.0092	0.0091	0.0087	0.05%
I–129	1.6E+07	0.0064	0.0064	0.0064	0.04%
Am–241	432.0	0.0127	0.0108	0.0057	0.03%
Cs–137	30.2	18.5310	1.8669	0.0002	0.00%
Pu–238	87.7	0.0078	0.0036	0.0002	0.00%
U Nat	4.5E+09	0.0001	0.0001	0.0001	0.00%
Sr–90	29.1	2.7483	0.2539	<0.0001	0.00%
H–3	12.3	13,957.5854	49.8209	<0.0001	0.00%
Pu–241	14.4	2.3125	0.0188	<0.0001	0.00%
Co–60	5.3	1,107.5944	0.0021	<0.0001	0.00%
Cm–234/44	17.3	0.0014	<0.0001	<0.0001	0.00%
Kr–85	10.7	0.0135	<0.0001	<0.0001	0.00%
Ba–133	10.5	0.0007	<0.0001	<0.0001	0.00%
TOTAL		15,283.4414	155.6798	18.1365	100.00%

Table F-2 presents the radionuclides contained in the 1996 LLRW shipped for disposal and the associated activities remaining 100 and 500 years after disposal.

Figure F-2 shows the percentage of each disposal class remaining in the total activity after 500 years and the percentage of remaining activity contributed by each generator category.

Figure F–2
Percentage of Activity After 500 Years in 1996 LLRW Shipped for Disposal – By Disposal Class and Generator Category